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THESIS

**THE IMPACT OF THE TYPE 094 BALLISTIC MISSILE
SUBMARINE ON CHINA'S NUCLEAR POLICY**

by

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June 2009

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CHINA'S NUCLEAR POLICY**

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ABSTRACT

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The Type 094 has been discussed at length in open source publications. This thesis advances those discussions by examining them in detail. Expected noise level, target sets, and class size are dissected and compared to historical data to verify the likelihood of mission tactics. This technical data, combined with a summary of the challenges faced in terms of submarine communications and control, will highlight Beijing's decision to deploy this new technology conservatively or more ... to maximize the intended target set. Washington must view the Type 094 as a vast improvement over their single Type 092 "Xia" class ballistic missile submarine. Atrophied United States ASW assets must be upgraded to meet this new challenge.

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I. INTRODUCTION

A. PURPOSE AND IMPORTANCE

China's successful sea trials of the Type 094 ballistic missile submarine (SSBN) have become an issue of concern for regional and global planners. A large body of writing has been published on the capabilities and prospective deployments of this new submarine. However, what has been overlooked is how deploying a ballistic missile submarine changes the makeup of China's nuclear deterrent force. Thus, this thesis will address the question: What benefits does a ballistic missile submarine offer a country that has adopted a strict no-first-use policy—and at what cost to China?

The deployment of reliable sea-based ballistic missiles has long been the goal of Chinese military planners. The Type 092 *Xia*-class SSBN, commissioned in 1981, was unreliable and predominately pier-bound, and China was never able to successfully deploy the *Xia* on a deterrent patrol. In addition, the *Xia*-class SSBN carried the JL-1 ballistic missile, with very limited range and capabilities. These circumstances changed when a new class of Chinese submarines, the Type 094 *Jin*, emerged as follow-on to the *Xia*-class. Currently, two to three “Jin” class ballistic missile submarines have been photographed in various military ports along the Chinese coast. By all accounts the *Jin* is a drastic improvement over the *Xia*, increasing the likelihood that China will be able to deploy a credible sea-based nuclear deterrent patrol in the near future.

Why is China aggressively acquiring sea-based missile technology? At first glance it seems redundant, given their robust and modernizing arsenal of land-based nuclear weapons. In recent years, China has shifted away from its reliance on liquid-fueled, land-based nuclear weapons. Liquid-fueled weapons are vulnerable to first strike capability because of their slow fueling times and the permanent and easily identifiable nature of their launch sites. Now, Beijing has begun to focus more on the use of *mobile* land-based nuclear weapons. Mobile, solid-fueled, land-based missiles offer significant advantages over liquid-fueled missiles deployed in either above ground launch platforms or traditional hardened silos because of their rapid deployment time and their mobility,

which makes them harder to detect and destroy. While there some problems associated with these weapon systems, including a vulnerable communications network that is susceptible to an initial nuclear attack, they do provide the communist leadership command and control options they could not possibly have with ballistic missile submarines.¹

Even with the recent advantages gained with mobile, solid-fueled, land-based missiles, China is developing a sea-based alternative as another “tier” in its pursuit of a survivable nuclear deterrent. Nuclear powers, including the United States, France, Russia, and Great Britain, have all pursued *submarine-launched* ballistic missiles because of their robust survivability. That is, if a ballistic missile submarine is at sea in an unknown (to the enemy) location, it can offer the assured deployment of a second strike.

In order to be successful in this effort, China must be able to build and deploy multiple capable ballistic missile submarines. The single Type 092 is the only sub of its type, and it is antiquated and acoustically disadvantaged by today’s standards.² It has limited communications, missile, and fire control systems that minimize its lethal range and effectiveness. In retrospect, the Type 092 is more of a “test-bed” for technology than actual implemented nuclear deterrent. However, the new Chinese Type 094 submarine likely employs proven Type 093 based quieting systems that approach modern American, Russian, and German-built submarines. These systems give the Type 094 the technology to remain hidden from modern antisubmarine forces. Even with advanced U.S. anti-submarine warfare tactics, a modern ballistic missile submarine like the Type 094 can be extremely difficult to find. If China is able to construct and regularly deploy a fleet of *Jin*-class submarines—with the JL-2 long-range ballistic missile - the United States will have to plan for, and take into account when dealing with Beijing, a survivable Chinese nuclear deterrent.³

¹ Communications with submarines require a great deal of support and equipment. Even with the best systems, submarines will go hours at a time completely out of communications reach. These issues will be discussed further in subsequent chapters.

² There are conflicting reports that argue a second Type 092 was either lost in a fire during construction or lost at sea.

³ The US will have to deal with a survivable Chinese nuclear deterrent in any case with the DF-31A. Bonnie Glaser, e-mail message to author, 7 April 2009.

B. PROBLEMS AND HYPOTHESES

This thesis will therefore address two questions. First, what benefits does China expect to gain from a robust, sea-based deterrent? There are numerous recognized advantages to ballistic missile submarines—so much so that Great Britain relies solely on them for strategic deterrence.⁴ Possible reasons range from the more tangible (real) aspects of stealth, reliability, survivability, and streamlined command structure to more ideational issues such as political prestige, international influence, and entry into a truly prestigious group (United States, Russia, Great Britain, and France). However, each of these should be evaluated separately, as they are potential alternatives and they tell us much about Chinese thinking regarding nuclear warfare. Therefore, part of my thesis problem is to assess why China has chosen to procure a sea-based deterrent system at this time.

Second, should the United States, China's chief security competitor, adjust its current defense of Taiwan tactics because of a credible Chinese second-strike ability? The United States has three options – increase the scope of the current missile defense systems, use additional resources (nuclear powered attack submarines (SSN)s and various anti-submarine tactics) to vigorously hunt and track Chinese ballistic missile submarines, or to acknowledge Chinese survivable second-strike capability and adjust policy. Washington is already doing the first, and finding room in the budget for new ASW—while preparing to acknowledge and adjust policy. As a result, U.S. actions in response to conflict over Taiwan must be adjusted to account for the possibility of grave consequences. The possibility of losing one West Coast city, as a result of an American interference over another Taiwan Strait crisis, becomes much more likely. Exploring Washington's response options to a new strategic threat is necessary. Therefore, part of this thesis will be directed toward exploring possible avenues to consider when facing a hostile country with a survivable nuclear deterrent.

⁴ Great Britain also has a "reliance on NATO response." Rear Admiral Eric A. McVadon, U.S. Navy (Retired), conversation, 30 December 2008.

The preliminary questions assessed in this thesis research are:

- Why is China pursuing a significant viable SSBN force? How does this compare to other countries, including the United States, which have relied on sea-based nuclear deterrents during the cold war? Are projects such as the missile defense systems being employed by the United States and Japan, driving this decision?
- How will China employ its nuclear ballistic missile submarines? Different scenarios are possible depending on the size of the force. According to reports, two “Jin” class submarines have been imaged. How could China employ these two submarines? What if they increase that number to five or more? Where sorts of considerations will drive basing decisions?
- Beijing has always controlled nuclear weapons at the highest level. Great care, including storing warheads and missiles in different locations, ensures that inadvertent launch is nearly impossible. Trusting low-level commanders, operating independently at sea, is a big step for Chinese leaders. How can this task be accomplished in China today?
- How will China react to a ballistic missile submarine casualty? Will Beijing immediately assume an attack has occurred against their deterrent force – and launch their remaining weapons as a response? How much more realistic are NFU and the policy of minimal deterrence with SSBNs?
- Finally, consider this development in terms of current U.S. policy. How can this policy, and associated acquisitions, be adjusted to account for the current shortcomings in ASW capabilities?

C. LITERATURE REVIEW

There is a large literature on issues related to this thesis. Many questions have been addressed, and this section surveys the answers provided in the existing literature. What are the benefits of ballistic missile submarines? Why does Great Britain gain by relying solely on this type of deterrent? Does nuclear war-gaming from the Cold War

period offer any insight into the possible scenarios involving ballistic missile submarines? How do the academic, military, and press communities foresee the employment of the *Jin*-class submarine? How many do they propose will be launched? How will *these* submarines be controlled? How do the United States and Japan feel about the *Jin*-class? With the new SSBNs, is there any indication that China will depart from its no nuclear first use policy of nuclear weapons⁵

There certainly must be tangible benefits to SSBNs development and deployment. The five most powerful nuclear countries have all pursued ballistic missile submarines. In looking at why a country would chose ballistic missile submarines over, or in addition to, other nuclear weapons, Great Britain's nuclear deterrence efforts offer a useful case study. Great Britain relies solely on four *Vanguard*-class submarines to provide its nuclear deterrent. In its Select Committee on Defense Report (published in 2007 by the House of Commons) it provides a comparison of nuclear weapons. Table 1 shows portions of this data that are applicable to Chinese decision makers.

⁵ China may be deriving benefits of NFU policy, added deterrent effect from doubts about credibility of the NFU commitment, and from the ability in practice to abandon NFU policy mid-step. Admiral Eric A. McVadon, U.S. Navy (Retired), conversation, 30 December 2008. This question suggests that technology might drive China to reconsider its NFU policy (this assertion will be covered in detail in chapter IV). While this may be the case in the future, in recent years there are other reasons that the Chinese have questioned the NFU policy. Bonnie Glaser, a Senior Associate, Freeman Chair in China Studies for the Center for Strategic International Studies (CSIS) argues that China's deterrent has been weakened by the U.S. development of long-range conventional strike weapons. Modifying the NFU position, essentially making it conditional, would bolster China's deterrence. Politically, however, that option is not available. Bonnie Glaser, e-mail message to author, 7 April 2009.

Table 1. Assessment of Deterrent Options⁶

Option	Assessment
Air-based system equipped with cruise missiles	Vulnerable to pre-emptive attacks
	Increasing readiness would be visible and potentially escalatory in times of crisis
	High rate/cost of aircraft upkeep and maintenance
	Very Costly
Land (silo)-based systems	Vulnerable to pre-emptive attack; immobile and impossible to conceal
	Expensive/Expansive command and control system
	Cost 2 – 3 times as much as submarines
Land (mobile)-based systems	Vulnerable to pre-emptive attack
	Expensive/Expansive command and control system
Ship-based system (ballistic missile surface ship)	Vulnerable to pre-emptive attack; easier to detect and tract than a submarine
	Less expensive but also less capable than a submarine-based option
Submarine-based system (ballistic missile submarine)	SSBN are undetectable ⁷
	Worldwide deterrent effect

In this preliminary look, it is clear that the decision to pursue submarines has many advantages for Beijing, over other nuclear options. Given the lessons learned from the advancement of precision weapon technology against moveable targets, putting mobile launchers at risk, survivability is likely a main goal for selecting to build SSBNs.⁸

⁶ Derived from Table 7: The Government's assessment of deterrent options found in Defence Committee, Parliament, House of Commons, Great Britain, *The Future of the UK's Strategic Nuclear Deterrent: the White Paper, Ninth Report of Session 2006-07* (London: House of Commons, The Stationary Office 2007), 46.

⁷ For the purpose of their deterrence strategy, Great Britain considers their SSBN's to be undetectable. In reality, submarines can be tracked by a number of sources. Captain Bernard D. Cole, U.S. Navy retired, conversation, 24 December 2008.

⁸ The ability of the United States precision missiles in Gulf Wars 1 & 2 has played a significant role in Beijing decision-making. The question of survivability, even of their mobile nuclear forces, becomes a major factor in the Chinese push for another nuclear choice. Chinese military experts have said privately that they fear that rapid development in US ISR capabilities will in the future render their mobile land-based systems vulnerable. They "don't want to put all their eggs in one basket." Bonnie Glaser, e-mail message to author, 7 April 2009.

But, as noted above, there are costs associated with relying on SSBNs. This thesis will further examine the way that China views these relative costs and benefits.

SSBN deployment is generally recognized to require three things: decentralized command of nuclear weapons, including storing the missile and warhead together; preprogrammed targets; and a plan of action for an SSBN casualty.⁹ All three of these are drastic changes to Chinese doctrine. First, there is a good possibility that China has never stored its missiles in the same location as warheads—this cannot be the case on submarines once deployed at sea.¹⁰ Second, “In May 2000, China, together with the other four nuclear-weapon states, issued a joint statement declaring that their nuclear weapons are not targeted at any country.”¹¹ Ballistic missile submarines may not be “pointed” at any country, however targeting data will likely be stored onboard and downloaded to the weapons when launch codes are received. Finally, China has always upheld that the “development of nuclear weapons has always been for the purpose of self-defense ...the Chinese government has solemnly declared that it would not be the first to use such weapons at any time and in any circumstance.”¹² However, the question of response after a suspected attack in a time of crisis over the loss of an SSBN must be raised.

The significance of the construction of the Type 094 has caused alarm in recent years. While many countries, including the United States, are drawing down their submarine forces, China continues to build submarines at a significant rate.¹³ This raises

⁹ It is very difficult for any country to determine why a submarine is lost. During the Cold War, the United States and Russia suffered submarine losses that are still shrouded in controversy. Regardless, in a crisis situation it is unlikely that China would consider the loss of an SSBN as an accident.

¹⁰ Hans M. Kristensen, Robert S. Norris, Matthew G. McInzie, *Chinese Nuclear Forces and U.S. Nuclear War Planning*, The Federation of American Scientists & The Natural Resources Defense Council. (November 2006), <http://www.nukestrat.com/china/chinareport.htm> (accessed 27 November 2008), 82.

¹¹ This is the one item that is likely the easiest to overcome. It is likely that in peacetime, the weapons themselves have no targeting data. However, that data must be on board the submarine. *White Paper: China's Endeavors for Arms Control, Disarmament and Non-Proliferation*. (People's Republic of China, Information Office of the State Council, 2005), 6.

¹² Ibid.

¹³ Chinese officials still argue that their nuclear stockpiles are still much, much lower than the United States and Russia. “China's New Sub Base to Make Waves,” editorial, *Jane's Naval Forces News*, 2 March 2006, www.janes.com (accessed 3 March 2008).

the question of how China plans to use its submarines. Numerous researchers address this issue who might be usefully grouped into three distinct classifications of Chinese SSBN writers. The first group, and most obvious, is the military. Military professors (Naval War College, Naval Postgraduate School, etc.) are combined with actual military personnel—both retired and active duty-- to complete this group. The second group is the press—including the foreign press, which provides a basic summary of what the general public believes. The last group is made up of the analytic professionals, which includes public intellectuals and “think tanks.” The professionals are the non-military strategists who often have a large impact on policy-makers.

There is one overall consensus among the three groups findings concerning the Type 094 submarine. Everyone believes that the Type 094 is as acoustically advanced as the *Victor III* Russian submarine, with a sound signature is considered to be equal to that of the U.S. *Los Angeles* class submarine, the assumed “opponent” of the Type 094.¹⁴ The basis for this claim is due to the fact that the Type 094 is built on Type 093 technologies; so most assume that the Type 094 will be equally as quiet as the Type 093.¹⁵ One PRC-affiliated press source asserted that the Type 094 would be as ultra-quiet as the U.S. *Ohio* class SSBN.¹⁶ Even without *Ohio*-class quieting, an acoustic advantage equal to a *Victor III* would give China the ability to deploy the 094 outside of local waters undetected.

Although most researchers agree that the Type 094 will be very quiet, distinct disagreements arise over how the Type 094 will be deployed. The first question of deployment is: what ports will China use to deploy the Type 094? China’s recent completion of the Yalong Bay submarine base on the island of Hainan gives China the

¹⁴ James C. Bussert, “Chinese Submarines Pose a Double-Edged Challenge,” *SIGNAL Magazine*, December 2003, <http://www.afcea.org/signal/articles/anmviewer.asp?a=93&print=yes> (accessed 3 March 2008), 4; Andrew S. Erickson and Lyle J. Goldstein, “China’s Future Nuclear Submarine Force: Insights from Chinese Writings,” *Naval War College Review* 60, no. 1 (Winter 2007), 67; Richard D. Fisher, Jr, “The Impact of Foreign Technology on China’s Submarine Force and Operations,” in Andrew S. Erickson, Lyle J. Goldstein, William S. Murray, and Andrew R. Wilson (eds.), *China’s Future Nuclear Submarine Force*, (Annapolis: Naval Institute Press, 2007), 149; Christopher McConaughy, “China’s Undersea Nuclear Deterrent: Will the U.S. Navy Be Ready?” in *Ibid.*, 92.

¹⁵ The Type 093 *Shang*-class submarine incorporates cutting edge technology considered equal to the U.S. *Los Angeles*- class submarine.

¹⁶ “Chinese Navy Completes Construction of “094” Nuclear Submarine,” trans. of *Ming Pao Online*, Hong Kong, (25 July 2007), *BBC Monitoring Asia Pacific*, 26 July 2007.

ability to deploy the Type 094 closer to deep water. While every group feels that China will use Yalong Bay as a home base for the Type 094,¹⁷ they are split on whether using this base is advantageous.¹⁸ If the United States mainland is China's primary target then Yalong Bay, which opens to the South China Sea, is too far from the United States. The JL-2's assumed range is 6000-8000km and if the Type 094 deploys to the South China Sea then they cannot effectively attack the United States mainland. Toshi Yoshihara, a professor at the Naval War College, states the problem best by bringing up the question: "Why would China want to operate further from the United States?"¹⁹

Setting aside the issue of Yalong Bay, there is no question that China will operate the Type 094 in the Yellow Sea. This is where the consensus ends. The professionals and the press believe that China will deploy their submarines into the open ocean.²⁰ The likelihood of U.S. submarine superiority in the Yellow Sea is the reason the analysts and the press think that China will deploy to the Pacific. If they are deployed to the Pacific, their "time on target" is decreased, giving the United States less time to respond to a ballistic missile attack. On the other hand, the military writers believe that China will employ a "bastion" strategy, keeping their subs under close air and surface cover similar

¹⁷ "China's New Sub Base to Make Waves," 1-2. Jing-dong Yuan, "Do China's New Submarines Signal a New Strategy?" *WMD Insights*, July/Aug 2007, http://www.wmdinsights.com/I17/I17_EA1_ChinasNewSubmarines.htm (accessed 26 February 2008), 1-3; Mure Dickie and Demetri Sevastopulo, "US Concerns as China Builds Nuclear Subs," *Financial Times* (London, England) 25 May 2007, 7; Paul H. B. Godwin, "China's Emerging Military Doctrine: A Role For Nuclear Submarines?," in Erickson, Goldstein, Murray, and Wilson (Annapolis: Naval Institute Press, 2007), 52; Toshi Yoshihara, "U.S. Ballistic-Missile Defense and China's Undersea Nuclear Deterrent: A Preliminary Assessment," in *Ibid.*, 342; Fisher, 138. James Patton, "Cold War SSN Operations: Lessons for Understanding Chinese Naval Development," in Erickson, Goldstein, Murray, and Wilson, 278.

¹⁸ "China's New Sub Base to Make Waves," 1-2. Yoshihara, 342. Fisher, 138.

¹⁹ "China's New Sub Base to Make Waves," 1-2. Yoshihara, 342. Fisher, 138.

²⁰ Jing-dong Yuan, *WMD Insights*, 1-2. "Rising China Threat Unmet If U.S. Navy Doesn't Seek Funds To Counter It, Analysts Say," editorial, *Defense Daily International* 18 January 2008, <http://www.defensedaily.com/VIP/common/pub/ddi/ddi01180801.html> (accessed 9 February 2008); Bill Gertz, "China Sub Secretly Stalked U.S. Fleet; Surfaced Within Torpedo Range of Aircraft Carrier Battle Group," *The Washington Times* (13 November 2006), <http://www.washingtontimes.com/national/20061113-121539-3317r.htm> (accessed 9 February 2008); Paul J. Bracken, *Fire in the East: The Rise of Asian Military Power and the Second Nuclear Age* (New York: Harper Collins Publishers, 1999), 27; Fisher, 138. Peter Howarth, *China's Rising Sea Power: The PLA Navy's Submarine Challenge* (Oxon: Routledge, 2006), 36.

to the Soviet Union, keeping the Type 094 protected in the Yellow Sea.²¹ The reason that military writers are in consensus on this is because the Yellow Sea offers distinct advantages for China as it makes the risk of open ocean operations unnecessary.²²

While the military writers give sound reasoning for the Chinese keeping the Type 094 in local waters, their point of view only accounts for a one-to-one submarine ratio between attack and missile boats. China will likely deploy their SSNs as SSBN escorts, with specific orders to protect the SSBNs at any cost.²³ Since China already outnumbers U.S. submarines four-to-one (with the ratio increasing every year) the United States may not have the necessary numbers to effectively keep the Chinese out of the Pacific.²⁴

On the subject of numbers, there is disagreement over the number of Type 094 submarines likely to be constructed. If China follows Great Britain's model that is based on the idea that in "keeping one submarine on patrol at all times, the UK avoids the risk of sending incorrect or misleading signals to a potential adversary at times of heightened alert,"²⁵ it is likely that China will develop four to six missile submarines.

While a great amount of research and speculation has been dedicated to figuring out the situations surrounding the development of the Type 094, there has been little research dedicated to understanding the options available to the United States. Given a robust second-strike capability, China will have a much greater bargaining chip in East Asia regional affairs. The final goal of this thesis will be to outline which bargaining options are affected by this Chinese development.

²¹ Robert G. Loewenthal, "Cold War Insights Into China's New Ballistic-Missile Submarine Fleet," in Erickson, Goldstein, Murray, and Wilson, 300; Christopher McConaughy, in *Ibid.*, 97; Michael McDevitt, "Sea Denial With Chinese Characteristics," in *Ibid.*, 369; Eric A. McVadon, "China's Maturing Navy," in *Ibid.*, 10; James Patton, in *Ibid.*, 278; Godwin, 52; William S. Murrery, "An Overview of the PLAN Submarine Force," in Erickson, Goldstein, Murray, Wilson, 68; Yoshihara, 343;

²² *Ibid.*; McConaughy, 96; McVadon, 10; Patton, 278.

²³ This was common for Russian nuclear forces when they deployed their SSBNs to bastions.

²⁴ There are other assets available for submarine detections and tracking (Aerial, Space, and Surface), and these would affect this balance. However, a competent SSBN crew traveling at patrol speeds easily overcomes these overt tracking methods.

²⁵ Defence Committee, Parliament, House of Commons, 8.

D. METHODOLOGY AND ROADMAP

This thesis puts the deployment of new Chinese ballistic missile into broader political and strategic context by examining it through technical, historical, and strategic theory lenses. Each sheds light on the program and what it implies for the future of Asia Pacific security situation. By researching this situation using a combination of technical assessment, SSBN normalcy, and local restraints, Chinese deployment options will be highlighted that may have otherwise gone unnoticed. Using these options can be implemented in a hypothetical Taiwan Straits crisis—which results in a nuclear escalation—this will be a guide for U.S. response. After successful implementation policy recommendations can be made regarding the adjustment of U.S. strategy.

This starts with a review of the benefits of ballistic missile submarines. Primarily using the British deterrent model (in addition to French, U.S. and Russian), this course of research will illuminate the expected payoff for Chinese planners. This stage of research will also illustrate problems associated with SSBN deterrence patrols. Primary evidence for this portion will be from a mixture of U.S. and Chinese nuclear experts (academics and think tanks).

In addition, closely examining how Beijing intends to control, employ, and develop the Type 094 will yield unique benefits. Unlike other weapon systems, the Type 094 must be analyzed in broad terms, including communications structure, numbers, and external features.²⁶ Without an intimate knowledge of the Type 094 and accurate estimations of its survivability it will be difficult to estimate how the Chinese will employ this weapon system. A 4-5 SSBN fleet is expected; 1-2 boats built for “crisis response” is less likely, although this would be more in line with Chinese no-first-use policy.

Current Chinese and United States published state doctrines (White Papers and all levels of published U.S. strategy) are used for overall themes these countries wish to display. Both countries’ words will be analyzed closely to accurately assess the expected SSBN actions in times of crisis. Since the Type 094 is relatively new, open source

²⁶ Deterrence by acquisition, rather than demonstrated capability, may apply to systems unlikely to be used in reality. Rear Admiral Eric A. McVadon, U.S. Navy (Ret.), Conversation, 30 December 2008.

(newspapers, etc.) will also be employed to find the most recent data. In addition, a massive amount of Chinese language materials, recently utilized by Goldstein and Murray, will provide additional primary evidence in order to bolster the conclusion.

II. BACKGROUND AND BENEFITS OF THE TYPE 094

China has been pursuing a ballistic missile submarine technology since the middle of the last century. Their first “try,” the Type 092 class, never reached the level of a successful deterrent. Following the Cold War, the world powers have rapidly decreased their level of operating nuclear stockpiles. China, on the other hand, has continued to pursue new nuclear weapons and better delivery systems as part of their military modernization. The Type 094’s introduction not only signals a great leap in modernization, but also the potential introduction of another nuclear “leg,” completing their triad.

This chapter will explore how the Type 094 will “fit” into China’s deterrent force. How does a survivable asset change the makeup of China’s deterrent? Can, and ultimately will, China move from minimal deterrence, dictated by a weak arsenal barely able to retaliate in a nuclear exchange, to limited deterrence—able to exchange blows in a limited nuclear war with a superpower? It would be easy to only look at this development in terms of the United States alone, but this is an oversimplification, Russia and India, for example also play a large role in this development. The British also employ ballistic missile submarines, traditionally against Russia (former Soviet Union) and to what benefit? Can some benefits, due to the British decision to only employ SSBNs, be highlighted and applied to the benefits Beijing desires to reach? However, the British employ top of the line submarines—with a long history of operations, how good does the Type 094 have to be to reach this level? With that being said, Type 094 images and intelligence has already been released, can a preliminary review of these sources validate the claims of the Type 094’s capabilities and quieting technologies?

A. SURVIVABILITY AND DETERRENCE DOCTRINE

The major benefits of ballistic missile submarine, for any country, are stealth and the resulting survivability as a result of that stealth. How this survivability will relate to China’s current policy and deterrence position warrant close review. Published Chinese doctrine will show how nuclear weapons can bolster strategy, beyond simple no-first-use.

China will have to decide if they want to capitalize on the options the Type 094 brings. Beijing can choose to simply bolster their nuclear policy or evolve their policy to utilize the maximum benefits available from a powerful, survivable sea-based nuclear platform. Identifying these benefits will ultimately show if China can now engage in “nuclear war fighting,” not just nuclear retaliation.

To begin this discussion, a ballistic missile submarine “benefit baseline” can be established. Specifically, what benefits, not available to land or air based platforms, do the Chinese seek from a sea-based nuclear weapon? The Internal Security Advisory Board (ISAB), a senior advisory panel of distinguished experts to U.S. Department of State, in a document not intended for public release,²⁷ argued, “holding the U.S. homeland hostage to missile attack is important to Chinese military goals.”²⁸ This statement is incomplete, and does not begin to cover the scope of Beijing’s efforts. It assumes that the whole purpose behind Chinese nuclear weapons is attacking continental United States cities. This type of simplistic reasoning appears common when any new Chinese weapons system débuts: it is simply Beijing trying to catch up to Washington. Beijing is seeking to accomplish more with the Type 094 *Jin*-class ballistic missile submarine. True, the Type 094 may give the People’s Liberation Army Navy (PLAN) the ability attack major American cities—however this is only one, motivation and one that China has long held with other forces.

In the past, China has had questionable relations with nuclear powers other than the United States, *and* they are in the process of a comprehensive military modernization program that has encountered recent successes. The first likely reason for this can be understood by examining the benefits the Type 094 will bring in terms of China’s no-first-use policy. In order for this policy to be successful: Beijing must hold a survivable strategic deterrent.²⁹ Ronald O’Rourke, in a paper he prepared for the United States

²⁷ This document does not represent Department of State (DOS) official policy. In fact, the document was never approved. It was released by an office in DOS without permission, and then retracted. Bonnie Glaser, e-mail message to author, 7 April 2009.

²⁸ *China's Strategic Modernization*, Report from the International Security Advisory Board (ISAB) Task Force, U.S. Department of State, (September 2008). <http://www.fas.org/nuke/guide/china/ISAB2008.pdf> (accessed 10 June 2009).

²⁹ An in-depth discussion of China’s “no first policy” will be made in Chapter IV.

Congress, echoes this; “the [Type] 094 could take the survivability of China’s nuclear deterrent to a new level, potentially enabling more aggressive posturing by Beijing in a crisis.”³⁰ O’Rourke’s statement can be broken into two parts. First, it is obvious that a “survivable” platform provides the best deterrent. However, O’Rourke sees the downside for the United States: a successful Chinese SSBN program, specifically the opportunity for China to “strong-arm” other countries, would increase Chinese influence in the region.

This opinion is not all-inclusive, as other authors see possibility for positive outcome. Toshi Yoshihara and his colleague at the U.S. Naval War College, James R. Holmes (a former naval officer), discuss possible benefits.

The survivability of SSBNs reduces vulnerability to preemption and thus eases the temptation for Beijing to adopt a destabilizing nuclear posture that undermines crisis stability and escalation control, including through increased dispersion and decentralized command and control.³¹

Their conclusion that having an SSBN on patrol will keep China from risking nuclear escalation (for example putting their land nuclear forces on *visual* alert during a crisis) is a compelling argument.³² If the Type 094 leads to better escalation control, as Yoshihara and Holmes insist, will China be more stable actor in a crisis when the Type 094 is on patrol? This question can only be answered in terms of doctrine...how does Beijing view nuclear weapons benefits, are they an offensive bargaining tool or the deterrent to all out attack?

A review of Chinese military publications, the *Zhanyixue* [The science of campaigns] and *Zhanlüexue* [the science of military strategy] provide discussion on this topic. Lt. General Wang Houqing and Maj. General Zhang Xingye, from the National

³⁰ Ronald O’Rourke, “CRS Report for Congress: China Naval Modernization: Implications for U.S. Navy Capabilities – Background and Issues for Congress.” Congressional Research Service. (8 October 2008), <http://fpc.state.gov/documents/organization/112036.pdf> (accessed 22 February 2009), 122 & 123.

³¹ Toshi Yoshihara and James R. Holmes, “China’s New Undersea Nuclear Deterrent: Strategy, Doctrine, and Capabilities.” *Joint Forces Quarterly (JFQ)*, Issue 50, (3rd Quarter 2008), http://www.ndu.edu/inss/Press/jfq_pages/editions/i50/11.pdf (accessed 22 February 2009), 35.

³² China’s SSBNs could enhance crisis stability IF they have adequate command and control. A Big IF. Bonnie Glaser, e-mail message to author, 7 April 2009.

Defense University in Beijing, argue that the “use of nuclear weapons has a ‘decisive influence’ (*juedingxing yingxiang*; 决定性影响) on the outcome of a war.”³³ This statement should not be interpreted as China seeking to use nuclear weapons in war, only that its ability to use them would likely influence the outcome of the war. However, by leaving the nuclear option “on the table,” these writings may be meant to ensure that Chinese wartime leadership is concerned with waging a successful campaign--regardless of the no-first-use policy, by considering their most destructive weapons in terms of offense and defense. But how will the Type 094 help the leadership in Beijing wage a successful military campaign? Sea based nuclear missiles may provide some benefit in war, but it is difficult to accurately assess the value of this type of capability.” The most probable answer is that in war, the most obvious benefit of an SSBN is its ability to force an opponent to consider the consequences behind any debilitating or regime changing attacks.

When China is at war, it is difficult to consider that Beijing would not employ nuclear weapons as necessary to save the communist regime. However, this opinion is easily debatable. If the communist regime is fighting a conventional “good fight” their population would likely stay behind them.³⁴ At peace, the question of nuclear weapon use has been thoroughly discussed, and Beijing has many use options. Mulvenon and Finkelstein explain, “The main Chinese term for deterrence, *weishe* (威慑), has traditionally had a distinctly pejorative connotation, which suggests an explicit effort to coerce and terrify an adversary with the threat of force.”³⁵ This definition alone does not provide the necessary evidence for judgment on the motivation behind the development of the Type 0--094, but it is worth some discussion. If the motivation behind the Type 094’s development is linked to Beijing’s desire to use the threat of nuclear weapons as a

³³ Wang Houqing and Zhang Xingye (eds.), *Zhanyixue* [The science of campaigns], Beijing, Guofang Daxue Chubanshe, May 2000, 370. Quoted in James Mulvenon and David Finkelstein, “China’s Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People’s Liberation Army.” The CNA Corporation, Alexandria Va. (December 2005), <http://www.cna.org/documents/doctrinebook.pdf> (accessed 23 February 2009), 139.

³⁴ Bonnie Glaser, e-mail message to author, 7 April 2009.

³⁵ Mulvenon and Finkelstein, 128.

form of coercion and terror, as believed by the ISAB, then it is certainly cause for alarm in Washington. However, this is likely not the case. China has employed a nuclear deterrent for decades, without ever using it to coerce or terrorize another country.³⁶ Given the current capabilities, specifically from range estimates of the DF31a, Beijing does not need an SSBN to pursue this course of action.

The more likely scenario is Beijing trying to ensure that its existing deterrence is viable.³⁷ Beyond this, Beijing may have the option to implement a new deterrence strategy as a result of the Type 094's existence. The *Zhanlüexue* explains four different types of deterrence strategy: maximum nuclear deterrence (*zuida xiandu he weishe*; 最大限度核威慑); minimum nuclear deterrence (*zuidi xiandu he weishe*; 最低限度核威慑); limited nuclear deterrence (*youxian heweishe*; 有限核威慑); and medium strength nuclear deterrence (*zhongdeng qiangdu he weishe*; 中等强度核威慑).³⁸ Maximum, limited, and minimum deterrence are important for this example.³⁹ Maximum nuclear deterrence promises overwhelming nuclear destruction in war. Wang Wenrong's description of maximum nuclear deterrence "appears to be a reference to contemporary U.S. nuclear strategy ... a 'perfect strategic defense system' (*wanshan de zhanlüe fangyu xitong*; 完善的战略防御系统)." ⁴⁰ China is not seeking to employ maximum deterrence, as Beijing views this method of deterrence as excessive or unnecessary.

³⁶ There is some evidence that top military officials were moving toward a degree of "coercive utility" arguing that U.S. officials would be unwilling to "trade" Los Angeles, New York, or San Francisco for Taipei. This view is not in line with Beijing's no-first-use tradition. Jason D. Ellis and Todd M. Koca, "China Rising: New Challenges to the U.S. Security Posture," *Strategic Forum*, No. 175, October 2000. (Publication of the Institute for National Strategic Studies, National Defense University) <http://www.ciaonet.org/wps/elj01/elj01.pdf> (accessed 21 May 2009), 2.

³⁷ The addition of a survivable nuclear asset will allow Chinese decision makers the assumption that they will always have nuclear assets, limiting spur of the moment "use them or lose them" tactics.

³⁸ Wang Wenrong (ed.), *Zhanlüexue [Science of military strategy]*, (Beijing: NDU Press, 1999), 360. Quoted in Mulvenon and Finkelstein, 137.

³⁹ Medium strength nuclear deterrence is mentioned in *Zhanlüexue*, but this does not appear to be an avenue Beijing is pursuing.

⁴⁰ Wang Wenrong, 360, quoted in Mulvenon and Finkelstein, 137.

Throughout its nuclear history it can be argued that China has employed minimum deterrence.⁴¹ This strategy finds its roots in “Mao Zedong’s writings from the 1930s, in which” he describes “*houfa zhiren*: Gain mastery by striking only after the enemy has struck first.”⁴² This strategy is the basis of the no-first-use policy, which is one driving force behind China’s decision to employ minimum deterrence. *Zhanliexue* offers the modern evolution of this strategy, “In contrast to maximum deterrence ... minimum deterrence is based on the assumption that an adversary is unlikely to be willing to risk facing the consequences of even the most limited nuclear retaliation.”⁴³ This strategy is based on the assumption that the PLA would lose a major portion of their nuclear forces in an initial attack, but still have enough weapons to inflict some minimal damage. Key to this strategy is the argument for limited retaliation. Unlike maximum deterrence, which gives a country no reasonable doubt that they will have forces to overwhelm a country if attacked, minimum deterrence offers no guarantee. It is employed because Beijing is currently force limited, and their nuclear second strike forces could only give China’s aggressor a “black eye,” not country ending destruction.⁴⁴

Limited deterrence is a natural upgrade from minimum deterrence. Alastair Iain Johnston, a professor of China in World Affairs at Harvard University, writes,

Limited deterrence...requires sufficient counterforce and countervalue tactical, theater, and strategic nuclear forces to deter the escalation of conventional or nuclear war. If deterrence fails, this capability should be sufficient to control escalation and to compel the enemy to back down.⁴⁵

⁴¹ Chinese think in terms of quality—for survivability and effectiveness—not in terms of numbers. For that reason, the term minimum deterrent is a poor description of China’s nuclear doctrine. Bonnie Glaser, e-mail message to author, 7 April 2009.

⁴² John Wilson Lewis and Xue Litai, *China’s Strategic SEAPOW: The Politics of Force Modernization in the Nuclear Age* (Stanford, Ca: Stanford University Press, 1994), 214-215.

⁴³ Wang Wenrong, 360, quoted in Mulvenon and Finkelstein, 137-138.

⁴⁴ In terms of the United States vs. China, if the PLA was to attack a major city or military installation with every surviving nuclear weapon, it would be a setback to United States efforts – but it would not be decisive. If the United States was to attack China with even a tenth of its nuclear forces, China’s infrastructure would be damaged to the point that China would not be able to continue a conflict.

⁴⁵ Alastair Iain Johnston, “China’s New ‘Old Thinking:’ The Concept of Limited Deterrence” *International Security*, vol. 20, no. 3 (Winter 1995/96), 5-6.

This definition requires careful analysis, it must be clear that the purpose of limited deterrence is to deter escalation in nuclear/conventional war not just persuade an opponent to question the cost of a first strike. In terms of Chinese context, this is a great departure from minimum deterrence – which has no conventional implications and no guaranteed use of nuclear weapons after the retaliatory strike. Two differences are readily apparent when analyzing this definition. First, this strategy requires a large number of advanced nuclear forces; Johnston goes on to say, “China does not presently have the operational capabilities to implement this vision of limited deterrence.”⁴⁶ However, he goes on to argue that (in addition to other nuclear advancements), “...a larger submarine-launched ballistic missile (SLBM) capability ... will improve the penetrability of warheads in the face of space and ground based [ballistic missile defense].”⁴⁷ And most importantly, this strategy is not compatible with China’s no-first-use policy. Having a force designed to deter escalation of conventional war would require the use of nuclear weapons in situations currently not endorsed by Beijing. However, this will expand the options available to the Chinese *after* nuclear war is initiated by another country. Until it is found and neutralized, the Type 094 will provide a platform capable of engaging in “nuclear war fighting,” possibly inflicting enough damage to convince their competitor to give up, or at the very least lower the conflict back to a conventional level.

Overall, It is very unlikely that the Type 094 will warrant any shift in Beijing’s deterrence stance. The Type 094 will simply bolster Beijing’s no-first-use policy, giving China a reliable second-strike platform when it comes online.⁴⁸ However, as previously mentioned, these technologies are not simply geared toward the United States. Understanding why Great Britain decided to employ only ballistic missile submarines will offer a better understand of the benefits Beijing will gain.

⁴⁶ Considering the number and ability of China’s nuclear forces combined with the promised adherence to the No-First-Use policy in a conflict, 2nd Artillery forces are not intended for deterring conventional attacks against China. A patrolling SSBN, with a large weapons load out, may shift this balance. Johnston, 6.

⁴⁷ Ibid.

⁴⁸ A detailed discussion, of the mismatch between the No-First-Use policy and the benefits the Type 094 brings occurs in Chapter IV.

B. GREAT BRITAIN CASE STUDY

There are several reasons why a study of Great Britain's nuclear force will lead to a better understanding of China's SSBN procurement. First, Great Britain's decision to only employ a sea based strategic deterrent isolates benefits and requires justification, two things that can be studied independently. And second, Great Britain employs four ballistic missile submarines, a size on par with the expected size of China's SSBN fleet.⁴⁹ Both of these factors, exclusively submarine based systems and small sized fleet will yield discussion factors currently unpublished in official Chinese unclassified literature.⁵⁰

This section will review the British nuclear deterrence works of Sir Michael Quinlan, who until his death in February 2009, was the Permanent Secretary at the British Ministry of Defence. His work entitled "The Future United Kingdom Strategic Nuclear Deterrent Force" from July 1980 gives an open discussion on the merits and controversy surrounding Britain's nuclear forces. This starts with a comparison of London's strategic goals with China, which sets the stage for a brief review of the reasons behind Great Britain's decision to retire their land and air nuclear forces. With this decision made, Quinlan offers a comparison of other nuclear forces and submarines. In keeping with the relevant topic at hand, Britain's concern with missile defense is also highlighted.

To discover the reason behind Britain's sole use of the SSBN as their strategic deterrent, an understanding of London's overall strategic goals is necessary. Deterrence is key, with the purpose of "[influencing] the calculations of a potential aggressor decisively before he embarks at all—even with non-nuclear weapons—on aggression."⁵¹⁻⁵² Quinlan explains what is necessary to make this strategy work in his

⁴⁹ The type 094 numbers debate will be discussed in Chapter III.

⁵⁰ This is not to say that China is moving to a submarine only nuclear force. The advantages of land based nuclear weapons, specifically against strategic competitors other than the United States, will justify their employment for the foreseeable future.

⁵¹ It is important to see the differences between British nuclear deterrent strategy and the Chinese doctrine of minimum nuclear deterrence. Unlike minimal deterrence, which is only intended to cause damage after an attack, British deterrence strategy is intended to control escalation, before and after an attack.

⁵² *The Future United Kingdom Strategic Nuclear Deterrent Force*, The Defence Council, Ministry of Defence, Defence Open Government Document 80/23, July 1980, 2.

assertion that, “The best way to ensure this is to put plainly before any possible aggressor a clear chain of immense risk, outweighing any advantage he could hope to gain.”⁵³ The wording, and specifically the use of the word immense, is important. Upon first glance, it appears as if Britain is overly optimistic: how could a small country, with one nuclear submarine on patrol armed with sixteen missiles, pose the Soviet Union an immense risk? The answer to this question is an important takeaway; *the size of the nuclear arsenal is of little importance when considering the power of one survivable nuclear weapon*.

Quinlan describes it in this manner, “The nuclear strengths of Britain ... may seem modest by comparison with the superpower armouries, but the damage [it] could inflict is in absolute terms immense.”⁵⁴ When comparing numbers of weapons it is easy to forget that just one Trident missile, employed on British SSBNs, can kill millions of people. When viewed in terms of China’s strategic competition with the United States, this becomes more important. In contrast to the United States, the required damage needed to be inflicted by the British on the Soviet Union was much higher, Quinlan explains, “Its history, outlook, political doctrines and planning all suggest that its view of how much destruction would constitute intolerable disaster might differ widely from that of most NATO countries.”⁵⁵ The British believed that one nuclear submarine on patrol was enough to persuade a large communist country, with hundreds of nuclear warheads, reason not to attack them conventionally or by nuclear means.⁵⁶

Since the British only needed a small force, why decide on submarines and not a simpler, more easily controlled deterrent? London dismissed both the air- and land-based options for different reasons. An aircraft based option was actually in the British arsenal until the early 1970s when it was retired. This air option was dismissed for a number of reasons; the following is applicable to a discussion of China:

⁵³ *The Future United Kingdom Strategic Nuclear Deterrent Force*, 5.

⁵⁴ *Ibid.*, 4.

⁵⁵ *Ibid.*, 5.

⁵⁶ It is important to note that Great Britain and France believed that if nuclear war erupted in Europe, the United States would quickly join to counter Chinese nuclear forces. A small nuclear force reflects this reality. Therefore there is no correlation between Britain and China’s force size decisions, as the Britain nuclear model is intended to isolate benefits from ballistic missile submarines, not add to the force/size debate.

Aircraft capable of launching strategic missiles need major airfields. The number of such airfields in Britain is limited and their positions are known...and we would not wish to have no alternative but to regard strikes on such airfields as compelling the final launch of our ultimate capability.⁵⁷

Clearly, air-based strategic weapons (primarily gravity bombs) were not going to work for the British, and Beijing likely has similar feelings. While China is certainly much larger than Great Britain, the advancements in satellite imaging have made the likelihood of unknown airfields slim. In addition, the level of precision found in today's conventional weapons makes any hope of airfield survivability in any conflict limited.

Mobile land and silo based ballistic missiles are another option that London dismissed. The defense council argued, "No ground-launched force based in Britain could achieve the special standard of invulnerability to surprise attack appropriate for our ultimate strategic capability."⁵⁸ This sentiment is amplified when the distance to London from Soviet launchers is considered. However, is the phrase "based in Britain" the key point in this argument? China has a much better chance of hiding and effectively deploying mobile missiles due to their *vast* continent and distance from their potential enemy.⁵⁹ However, recent research, performed by Keir A. Lieber and Daryl G. Press, has called into question the survivability of any Chinese land-based missiles from an American first strike.

China's current silo-based missiles have little chance of surviving a U.S. disarming strike. In fact, U.S. counter-force capabilities have grown so lethal in the past 15 years that the United States has low-casualty options — using conventional or low-yield nuclear weapons — for destroying China's silo based nuclear force. Even China's more survivable land-based deterrent -- e.g., their mobile medium- and long-range mobile missiles -- are far from invulnerable. China's missile garrisons can be located with even publicly available satellite images. It would be stunning if the United States had not devoted substantial intelligence assets to observing

⁵⁷ *The Future United Kingdom Strategic Nuclear Deterrent Force*, 11.

⁵⁸ *Ibid.*, 11.

⁵⁹ The distance from China to the continental United States is much greater than the distance from Russia to the United Kingdom. However, this is not to imply that Chinese nuclear forces are only intended to deter the United States. The Russia/India factor will be discussed in following chapters.

the day-to-day routines at these garrisons, to monitoring the roads that mobile missiles use when they ventured out, and most importantly for tracking the movement of missiles during exercises. The Soviets recognized the vulnerabilities of mobile missiles and wisely built hundreds of missiles and launchers to establish a truly invulnerable force. U.S. technical intelligence gathering has improved since the Cold War; the Chinese will need a substantial mobile missile force to generate a truly survivable deterrent.⁶⁰

This research, which conclusion can certainly be argued, opens the discussion on whether or not; Chinese planners should consider their land-based missile vulnerable.⁶¹

While these arguments against aircraft or land-based missiles are convincing and certainly in the best interest of London, sea-based systems are far from perfect. Surface based systems offer very little over land-based systems as they are easy to find and nearly as expensive as submarines. According to Quinlan,

Surface ships compare poorly with submarines. They are not markedly cheaper for a given missile carrying capacity, speed or endurance; they are much easier for an enemy to find and track; and any attempt to combine the strategic task with others...would pose the problem of conflicting operational demands.⁶²

Beyond this statement, no follow-on discussion of surface deployed weapons occurs in the British strategic document.

Submarine launched missiles offer both benefits and problems that are different from other systems. Ultimately, the British government believed that a Polaris submarine on patrol was...“effectively invulnerable to pre-emptive attack and at high readiness.”⁶³ The idea of invulnerability to pre-emptive attack is unique to submarines. The preemptive attack of a ballistic missile submarine requires more than a simple order from a government. First, the SSBN must be held and tracked at a close enough distance for

⁶⁰ Daryl G. Press, e-mail message to author, 9 March 2009.

⁶¹ Lieber/Press insights, while valuable, are not shared by the entire community. Some of their work has been widely criticized. China’s mobile missiles are likely not as vulnerable as they are portrayed to be in this article. However, even if not comprehensively accurate, the authors have highlighted some of the vulnerabilities that are relevant to China’s land-based force.

⁶² *The Future United Kingdom Strategic Nuclear Deterrent Force*, 12.

⁶³ *Ibid.*, 6.

attack. Second, the attacking platform (likely an attack submarine) must be in receipt of orders to attack, and finally, that submarine must make a successful attack. This entire process, which by no means is assured, must be closely coordinated with other attacking forces. When these factors are combined, the benefits of a submarine seem overwhelming. However, this is only one side of the story.

The British understood that there were threats and worried about the Polaris' ability to penetrate *future* anti-ballistic missile defenses (BMD) and the “growing Soviet competence in anti-submarine warfare (ASW).”⁶⁴ In mitigating the threats posed by ASW and BMD, the deployment location of a ballistic missile submarine becomes important. A country, such as China, may be quick to deploy its SSBNs in locations close to their own coastline. Coastline deployment brings problems and rewards, which Quinlin identifies, “Operation around our own shores could make direct protection by our own forces against air or submarine attack easier, but it would also be more vulnerable to mining.”⁶⁵ Blue water deployments lower these vulnerabilities, however they bring with them a new set of problems, including limited protection from enemy SSNs and communication issues.⁶⁶

Deployment options rely heavily on the size of force China chooses to produce. Britain has decided that four boats are adequate for their deterrent mission. “Four is the minimum needed to sustain without fail at least one always on patrol...A fifth boat would also offer a margin of insurance against possible risks, such as a marked relative improvement in Soviet ASW or losing a boat by accident or major unforeseen defect.”⁶⁷ The decision for four is based on the decision to always have one submarine on patrol, adequate to ensure “immense risk” and constant: to control and fears of escalation that the quick deployment of an SSBN during a crisis would bring. In addition, having a

⁶⁴ *The Future United Kingdom Strategic Nuclear Deterrent Force*, 7.

⁶⁵ *Ibid.*, 13.

⁶⁶ A detailed discussion of likely type 094 deployment locations will occur in chapter III.

⁶⁷ *The Future United Kingdom Strategic Nuclear Deterrent Force*, 21.

constant at sea presence negates most aspects of missile defense: by decrease the “time-to-target” and confusing the “axis of attack,” submarine launched ballistic missiles are much more difficult for missile defense systems to overcome.

Overall, the decision by London to employ only ballistic missile submarines has led to many benefits, applicable in discussion of Chinese ballistic submarine acquisition. Questions remain as to their validity in a world without the Soviet Union, their design designated target. Currently, Britain may be exercising “virtual deterrence.”⁶⁸ A theory meant to summarize Quinlan’s idea, “The deterrent rests...on long-term uncertainties rather than near-term probabilities, addressed to whom it may concern.”⁶⁹ This idea, when applied to the Chinese, brings a to light very important point. The idea that Beijing is developing the Type 094 to meet one strategic challenge is incomplete. There are many factors driving Beijing’s decisions to build and deploy the type 094.

C. TYPE 094 DEVELOPMENT DRIVING FACTORS

China’s decision to produce the Type 094 is not the result of just one strategic problem. A mono-causal approach, arguing that China’s sole purpose is to hold the United States at risk of nuclear attack, is incomplete. A discussion of non-traditional factors, and their importance, is vital for understanding what role the Type 094 will play in the future. Three factors in particular lead directly to a better understanding of the likely deployment scheme, mission, and force size.⁷⁰ First, the research, production, and placement of a missile defense shield in Asia is a matter of concern for the Chinese. Second, India is an emerging superpower on the cusp of deploying a ballistic missile submarine. Finally, Russia is the most powerful nuclear state in Asia, and will remain so for the foreseeable future.

⁶⁸ A phrase coined by John Ainslie, *The Future of the British Bomb*, WMD Awareness Programme (London: Clydeside Press, 2006), 19. Quoted in Jeremy Stocker, “The United Kingdom and Nuclear Deterrence,” *Adelphi Papers*, no. 46(386), <http://www.informaworld.com/10.1080/05679320701266349> > (accessed 2 March 2009).

⁶⁹ Michael Quinlan, “The Future of United Kingdom Nuclear Weapons: Shaping the Debate,” *International Affairs*, vol. 82, no. 4 (July 2006), 635.

⁷⁰ Long-range conventional strike and space must be considered when missile defense is discussed. It is the combination of the three that China is concerned about. Do to its limited scope, only missile defense is discussed in this thesis. Bonnie Glaser, e-mail message to author, 7 April 2009.

The recent decision by the United States to develop and deploy a ‘missile shield’ in Asia is surrounded by heated controversy. China’s concern, in particular, is well founded. According to the Missile Defense Agency, U.S. Department of Defense, Japan was the first Asian country to successfully test an intercept missile, in December of 2007, with three more tests scheduled for 2010.⁷¹ Sha Zukang, a Chinese diplomat currently serving at the United Nations Department of Economic and Social Affairs head, explained China’s fears almost a decade ago:

Some advanced TMD systems in development already have the potential to intercept strategic missiles. Such systems, once deployed in North-East Asia, will turn the region into the forefront of the US NMD system. Secondly, to introduce advanced TMD systems into North-East Asia will further enhance US capabilities to interfere in regional affairs. This is particularly alarming against the backdrop of NATO expansion, NATO's new strategic concept and the growing propensity of the US to use military force in international affairs. Thirdly, the US-Japanese joint development of TMD systems will accelerate Japan's pace of re-militarisation.⁷²

Beijing’s perceptions of Washington’s interference in East Asian regional affairs and its willingness to pursue military options do not make the introduction of missile defense systems seem “defensive.” Very few topics are discussed as openly and heatedly in the Chinese press. *Xinhua*, a state sponsored Chinese news group, reports that United States’ sponsored missile defense systems, “Spark a new arms race, but also threaten security and stimulate nuclear proliferation, instead of promoting security and stemming the spread of nuclear weapons.”⁷³ The open deployment of the Type 094, as well as the development of other nuclear weapons, is likely a response by China to this perceived aggression.

However, Washington has a different point of view. Greg May, an author from the Nixon Center, explains this sentiment, “To the extent that TMD and NMD can give

⁷¹ “Frequently Asked Question (FAQ): Sea-Based Midcourse - Aegis Ballistic Missile Defense (Aegis BMD),” Missile Defense Agency, U.S. Department of Defense, <http://www.mda.mil/mdalink/html/faq.html> (accessed 7 March 2009).

⁷² Sha Zukang, “U.S. Missile Defence Plans: China’s View,” *Disarmament Diplomacy*, no. 43 (January/February 2000), <http://www.acronym.org.uk/dd/dd43/43usnmd.htm> (accessed 7 March 2009).

⁷³ “Liberation Army Daily Criticizes U.S. Missile Defense Plan,” *Xinhua News Agency* (English), 25 January 1999.

Americans and Japanese protection from limited threats, such as those posed by North Korean, then missile defense is a worthwhile effort, even if it causes some strains with Beijing.”⁷⁴ Evan Medeiros, a senior political scientist at the RAND Corporation, explains these strains, “U.S. NMD and TMD policies signs of increasingly hostile US intentions toward China...US nuclear and advanced conventional capabilities were sufficient to deter attacks from small states like North Korea.”⁷⁵ This argument is bolstered by other lower quality rationales. The basic argument, that members of the Clinton and Bush administrations unofficially implied that an “unintended” positive consequence of Asian missile defense was the ability to counter China’s small nuclear force, has become a stumbling block for U.S./China relations.⁷⁶ A more complex argument, that the current missile defense shield deployed by Japan and developed by the United States is designed to defeat multiple independently targetable reentry vehicles (MIRV) and dummy warheads, technologies North Korea will not possess for decades is not entirely correct.⁷⁷ However, some Washington analysts quickly argue this point, May explains, “canceling TMD [will not] prevent China from modernizing its missile and nuclear forces. China will upgrade its capabilities regardless.”⁷⁸ Considering the strategic advantages provided by their unique survivability, discussed earlier, that ballistic missile submarines bring, it is no surprise that Beijing has been researching the Type 094 for some time, long before the United States starting selling Japan the ability

⁷⁴ Greg May, “China’s Opposition to TMD is More About Politics Than Missiles,” *Foresight* (Tokyo) February 2000, http://www.nixoncenter.org/publications/articles/2_00ChinaTMD.htm (Accessed 9 March 2009).

⁷⁵ Evan S. Medeiros, “Ballistic Missile Defense and Northeast Asian Security: Views from Washington, Beijing, and Tokyo,” The Stanley Foundation and Center for Nonproliferation Studies, Monterey Institute of International Studies, April 2001, 9.

⁷⁶ Michael R. Gordon, “Bush Is Due to Meet Chinese on Issues Crucial for Ties,” *The New York Times*, 19 March 2001, <http://www.udel.edu/communication/COMM418/begleite/globalagenda/readings/NYTchina2.htm> (accessed 21 May 2009).

⁷⁷ See forthcoming report Christopher Twomey and Sarah Watson, “US-China Strategic Dialogue, session IV” to be available on ccc.nps.navy.mil under “Conference Reports” tab. Any country that is developing ICBMs can, in fact, develop decoys, pen aids, etc. It is not the same technology as MIRVs. The missile defense system is designed to deal with decoys and pen aids which provides some inherent capability to deal with MIRVs, but that is not the purpose. Bonnie Glaser, e-mail message to author, 7 April 2009.

⁷⁸ May.

the shoot down weapons. But it is the *accelerated development*, including openly releasing Type 094 pictures, are alarming and are likely partially due to Washington's willingness to deploy a missile defense shield.

In addition to the missile defense shield, regional powers are another factor pushing the Type 094 development. Analysts at the Naval War College attest,

Beijing must worry about not only a U.S. effort to knock out the Chinese intercontinental ballistic missile (ICBM) force in a Taiwan contingency, but also India, a new nuclear neighbor that China shares a long border and a tumultuous history with. [And] ... despite Russo-Chinese cooperation in recent years. How these competing considerations will affect the size and operations of the PLAN SSBN force remains to be seen.⁷⁹

There are two problems to overcome when trying to prove that China is competing with India. The previous Secretary of State, Condoleezza Rice explains the first, "There is a strong tendency conceptually to connect India with Pakistan and to think only of Kashmir or the nuclear competition between the two states. But India is an element in China's calculation."⁸⁰ The source of this quote is indicative of the second problem: there are multiple sources of U.S. publications that call India and China strategic competitors, however there are limited sources available in China that does the same. Publicly, China considers India an economic partner, not a potential military adversary. Baladas Ghoshal, a professor of Southeast Asia studies at Jawaharlal Nehru University in India explains, "The imperative for concentrating on development and exploring mutually beneficial schemes to promote that development will drive India and China to look for ways to develop a partnership based on cooperation and competition."⁸¹

Given the above discussion, combined with the proximity of both nations and the importance they put in the Indian Ocean, it is clear that India and China are in fact

⁷⁹ Yoshihara and Holmes, 33.

⁸⁰ Condoleezza Rice, "Campaign 2000: Promoting the National Interest" *Foreign Affairs*, vol. 79, no. 1 (January/February 2000), <http://www.foreignaffairs.com/articles/55630/condoleezza-rice/campaign-2000-promoting-the-national-interest> (accessed 10 June 2009), 56.

⁸¹ Baladas Ghoshal, "India and China: Emerging Strategic Partnership in the Twenty-first Century?" *The China-India Project, Occasional Paper Series, Paper No. 2* (Hong Kong: Centre of Asian Studies, University of Hong Kong, 2005), Abstract at http://www.hku.hk/cas/pub/Occasional2_bghoshal.pdf (accessed 30 March 2009).

strategic competitors, and this competition is partially driving China's nuclear development. Recently (2008) India's External Affairs Minister, Pranab Mukherjee, echoes this sentiment describing the rise of China as "a strategic challenge to a rising India."⁸² Kaplan shows this argument's relevancy when discussing China's naval modernization, "India's and China's great-power aspirations, as well as their quests for energy security, have compelled the two countries 'to redirect their gazes from land to the seas.'"⁸³ The Indian Ocean, of great economic and strategic importance to both China and India, is at the center of this argument. There are signs that China has accepted this fact. Zhang Ming, a Chinese naval analyst explains, "India is perhaps China's most realistic strategic adversary."⁸⁴ Therefore, the consideration of Indian power, as an element of competition, will be a useful tool when explaining likely Chinese Type 094 force size and deployment locations.⁸⁵

While it is likely that the Chinese navy will be able to outpace any Indian nuclear developments, Russia's arsenal is simply too large for China to overcome. However, there is no indication that entering an arms race with Russia is in China's future. In fact, recent military ties, for example the military exercises performed under the Shanghai Cooperation Organisation (SCO), would point to a strengthened China-Russia bond. President Vladimir Putin, in an interview for China's *People Daily*, supported this rhetoric, "the common point of the national interests of the two countries is established on the basis of Russian-China cooperative partnership, the common attitude toward some major international issues is the foundation for our strategic cooperation."⁸⁶ However some authors including Nicklas Norling, a research fellow and managing editor of the China and Eurasia Forum Quarterly, argue that the extent of this partnership has major

⁸² "Another Indian Air Field Reopens on China Border," *India News Online*, 10 November 2008. <http://news.indiamart.com/news-analysis/another-indian-air-f-20297.html> (accessed 21 May 2009).

⁸³ Holmes and Yoshihara, quoted by Robert D. Kaplan in "Center Stage for the Twenty-first Century: Power Plays in the Indian Ocean," *Foreign Affairs*, vol. 88, no. 2 (March/April 2009), 17.

⁸⁴ Zhang Ming quoted in *Ibid.*, 23.

⁸⁵ A detailed discussion of likely type 094 deployment locations and force size will occur in Chapter III.

⁸⁶ "China-Russian Relations Remain Better Than Russian-U.S. Ties," *People's Daily*, 28 November 2002, http://english.peopledaily.com.cn/200211/28/eng20021128_107614.shtml (accessed 30 March 2009).

limitations, “It is unlikely that Sino-Russian joint military forces will be used for other purposes than intimidation and/or arms demonstrations.”⁸⁷ The limits of this relationship are very important, because the nature of *economic*, vice defense, allies dictates limited, short-term trust and cooperation.⁸⁸

China and the United States share many economic ties, yet they still consider each other as potential adversaries; it is likely that China and Russia follow this mold as well. Chinese planners must consider the idea that China may face Russia in the future. Yoshihara and Holmes back up this argument; “Russian sites will almost certainly find themselves on the target list for Chinese submarines.”⁸⁹ This uncertainty, over how Russia will impact the development, deployments, and numbers of the Type 094, is not easy to deduce.

How does multiple potential adversaries (for the sake of China: Russia and India) affect Beijing’s choice to modernize their nuclear forces with ballistic missile submarines? Specific capabilities, most importantly the ability to prepare for nuclear war without escalatory telltale signs, are particularly relevant to both cases. Due to Russia and India’s proximity to China a deployed SSBN offers little in the way of a new, or even improved, nuclear tactical advantage. Overall, it is clear that the United States is the driving factor behind the Chinese push to develop the Type 094 SSBN. Other factors, including missile defense, India, and Russia are contributing to the development, and will likely influence Beijing’s ballistic missile submarine use. With these issues in mind, new questions arise, and the first is: How good does the Type 094 have to be to be successful?

⁸⁷ Nicklas Norling, “China and Russia: Partners with Tensions,” *Policy Perspectives*, vol. 4, no. 1 (2007) http://www.silkroadstudies.org/new/docs/publications/2007/Norling_China_and_Russia.pdf (accessed Mar 30, 2009), 45.

⁸⁸ It is also important to note that the supply of weapons and technology from Russia to China has waned over recent years. Even at its peak, Russia was careful to not sell China their most advanced systems.

⁸⁹ Yoshihara and Holmes, 33.

D. TYPE 094 REALITIES

A good estimation of the Type 094's important characteristics can be made from published photographs and reports. Because of their basic mission: to remain hidden in all situations, the most important characteristic of a ballistic missile submarines is their emitted noise. In the press, most estimates of the Type 094 sound signature (noise level) are from published pictures, which if analyzed correctly, can provide some qualitative comparison. The proper approach involves breaking down the images into separate hydrodynamic design categories. By looking at obvious design factors, including shape, skin friction (sail/surface), flood openings, and propellers a better assessment can be made.⁹⁰ Given the importance of flood openings and propeller design, unique to the Type 094, they are discussed at length. In addition, utilizing estimated speed to complement these factors would help narrow the sound estimate. Overall, many design features found on acquired technologies from advanced submarine builders, such as the French and Russians, should be considered in use on the Type 094.

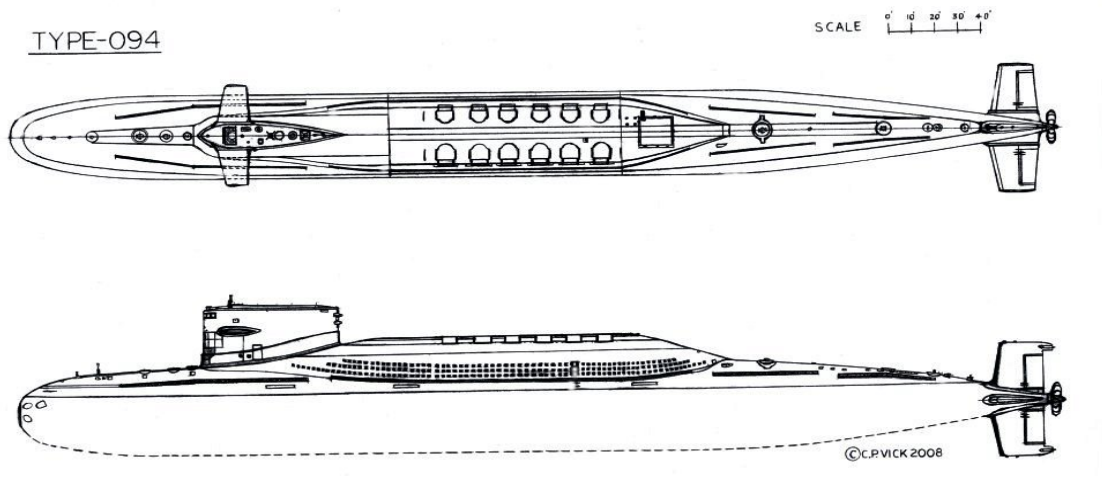


Figure 1. Type 094 Line Drawing⁹¹ Source: globalsecurity.org

⁹⁰ P.N. Joubert, "Aspects of Submarine Design," Australian Government, Department of Defense, Defence Science and Technology Organisation, <http://dspace.dsto.defence.gov.au/dspace/bitstream/1947/3919/1/DSTO-TR-1622%20PR.pdf>, (accessed 1 April 2009).

⁹¹ Charles P. Vick, "TYPE-094," www.globalsecurity.org ©2008; JPG, <http://www.globalsecurity.org/wmd/world/china/images/type094-line.jpg> (accessed 1 April 2009).

1. Shape

According to Professor P.N. Joubert, of the Fluids Group, Mechanical and Manufacturing Engineering at the University of Melbourne, the classic teardrop submarine shape provides measurable noise reductions benefits.

The ideal form involves a continuously changing diameter along its length. The bow would be ellipsoidal and the stern paraboloidal in shape. A modest departure from this ideal with a portion of parallel mid-body would reduce the draft and the building costs by positive amounts without any severe drag and noise penalties.⁹²

The Type 094, as it appears in the artist rendition in figure 1, is not ideal. The additional height needed for the JL-2 missile certainly imposes noise penalties. According to Jane's, "[a] characteristic large missile compartment 'hump' at the rear of the fin has a detrimental effect on both hydrodynamic performance and flow noise levels."⁹³ When compared to the *Ohio*-class SSBN (Figure 2), this deficiency becomes clear.

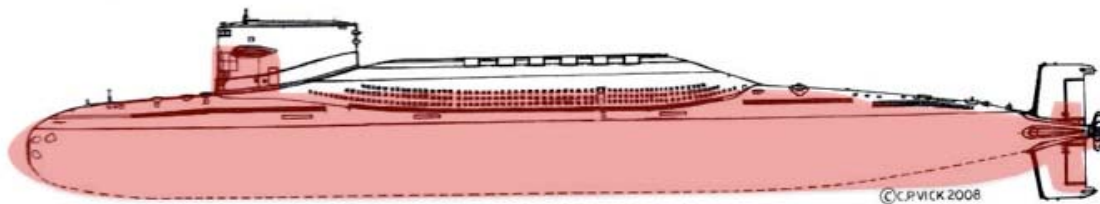


Figure 2. Ohio/Type 094 Comparison⁹⁴ Source: globalsecurity.org

2. Skin Friction (Sail/Surfaces)

The large sail, visible on the Type 094 will result in a higher sound signature than a smaller design would have brought. Joubert explains, "Skin friction is minimised by keeping the sail as small as possible. The skin must be as smooth as possible with no

⁹² Joubert, 17.

⁹³ "Jane's Underwater Warfare Systems: Delta III class," *Jane's Strategic Weapons Systems*, 15 January 2009, www.janes.com (accessed 10 June 2009).

⁹⁴ Author's overlay of an Ohio class SSBN on C.P. Vick's line drawing of a type 094. Vick.

obtrusive edges, joins or holes.”⁹⁵ As shown in Figure 2, the size of the sail on the Type 094 is proportionally double that of the Ohio class SSBN. One positive, helping to reduce noises associated to friction is the incorporation of “advanced composite materials ... credited with capability to absorb vibrations and sound.”⁹⁶ These materials are in use on all modern submarines, and certainly enhance the Type 094 sound absorption capabilities.

3. Flood Openings

In addition to the sail, the visible flood openings seen below the missile hatches in figure 3, will contribute to an increased sound signature. According to Joubert:

Flood openings and holes in the hull and casing represent a measurable and unwanted source of noise and drag. The sail and casing can contain a large amount of water, which has an adverse effect on stability when surfacing until it drains...Induced fluctuations of flow in and out of the hole due to variations of the stagnation point on the edge of the hole facing upstream cause fluctuating eddies as is arranged deliberately on a flute or organ pipe. Resonance can then accentuate the problem. While shutters may prevent this, their mechanical complication gives rise to other problems.⁹⁷

As can be seen from the picture below, there are numerous flood openings on the Chinese boat. The reason behind these openings is unclear. World War I and II boats were required to submerge very quickly, make flood holes necessary.⁹⁸ A situation where the Type 094 would need to submerge quickly is highly unlikely. This is not an uncommon design feature however, as it was also found on the Russian Delta III SSBN, although it was almost completely phased out with the upgraded design of the Delta IV in 1985.⁹⁹

⁹⁵ Joubert, 35.

⁹⁶ O’Rourke.

⁹⁷ Joubert, 35, 36.

⁹⁸ Ibid., 36.

⁹⁹ “Jane’s Underwater Warfare Systems: Delta IV class,” *Jane’s Strategic Weapons Systems*, 15 January 2009, www.janes.com (accessed 10 June 2009).



Figure 3. Type 094 Flood Openings¹⁰⁰ Source: sinodefense.com

4. Propeller

No photos of the propeller have been released in the open press. However, there is no reason to believe that the propeller will not incorporate an advanced design, likely to rival all modern submarines. According to O'Rourke's report to Congress:

PRC scientists have long been conducting research concerning the fundamental sources of propeller noise. For instance, experts at China Ship Scientific Research Center developed a relatively advanced guide-vane propeller by the late 1990s. This, and the fact that China already has advanced seven-blade propellers with cruciform vortex dissipaters on its indigenous Song-class and imported Kilo-class diesel submarines, suggests that the [Type] 093 and [Type] 094 will have significantly improved propellers.¹⁰¹

A seven blade modern propeller, with attached vortex dissipaters, will give the Type 094 a distinct sound advantage over the Russian Delta class submarines previously discussed.

Overall, based on visual qualitative analysis comparison, the Type 094 is likely much louder than the super quiet Ohio. It has a large sail, deviates from the ideal shape, and includes vents. An advanced propeller will mitigate, but not eradicate these problems.

¹⁰⁰ Unaccredited image available at SinoDefense Online, "Type 094 (Jin-class) Nuclear-Powered Missile Submarine," [www.sinodefence.com](http://www.sinodefence.com/navy/sub/type094jin.asp), JPG, <http://www.sinodefence.com/navy/sub/type094jin.asp> (accessed 10 June 2009).

¹⁰¹ O'Rourke, 122, 123.

However, this is not to say that the Type 094 is going to be a loud platform overall; it is likely a small step ahead of the Delta III SSBN. It is important to consider that the average speed of an SSBN on station is less than five knots; comparisons made in terms of attack boats, which travel in excess of 15 knots have limited applicability. According to reports, the Delta III registered between 125-130 dB at 4-8 knots, the likely speed of an SSBN on patrol.¹⁰² Considering modern propeller design, this correlates with certain Chinese reports, which argue that the Type 094's acoustic signature was 120 dB.¹⁰³ According to E.V. Miasnikov, Senior Research Scientist at the Center for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology, a very quiet submarine registers about 100 dB, a quiet submarine about 120 dB, and a loud submarine about 140 dB.¹⁰⁴ If the Type 094 puts out 120 dB at sea, it will be very difficult to track. When the limitations of using one platform (SSNs) to track the Type 094 are considered, the United States Navy will have to make adjustments. The Type 094 will be a quiet platform, released at the opportune moment in United States anti-submarine warfare (ASW) decline.

E. TYPE 094 EXPECTATIONS

China's first ballistic missile submarine, the Type 092 *Xia*-class, was never considered to be a survivable deterrent. The product of "trial and error" (many onboard systems have been upgraded and tested at sea) the Type 092 spends little time away from the pier.¹⁰⁵ Is the Type 094 a large improvement over the Type 092? Two schools of thought attempt to answer this question. The first school contends that planners in Washington assume that the Type 094 will be plagued with quality issues, lack sufficient quieting, and overall be a small improvement over the Type 092. The second school of thought maintains that the Type 094 will incorporate the quality and quietness of the

¹⁰² E.V. Miasnikov, "The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments," Moscow, Institute of Physics and Technology, Center For Arms Control, Energy, and Environmental Studies at Dolgoprudny, 1995, <http://www.fas.org/spp/eprint/snf03221.htm> (accessed 1 April 2009).

¹⁰³ O'Rourke, 122, 123.

¹⁰⁴ Miasnikov.

¹⁰⁵ McConaughy, 86.

Type 093, providing an effective second-strike capable weapon. Upon first glance, it is likely that the Type 094, when put to sea will fall somewhere in the middle of this scale. The Type 094 must overcome “basic” ASW tactics traditionally used against a boomer (ballistic missile boat “slang”). Attack boat trailing, helicopter dropped sonabuys, satellite surveillance, and underwater arrays are the “maximum” spread of options utilized during the Cold War. If the Type 094 is vulnerable and unreliable like the Type 092, a minimal (ASW) effort will be required. If, on the other hand, the Type 094 is as (or nearly as) capable as the Type 093 than maximum, cold war level, effort is required. However, what if the Type 094 falls somewhere in the middle? Could there be a “medium” level ASW effort available, that Washington can employ, to counter the Type 094?

The answer to this question is *no*: when the Type 094 deploys the United States must employ maximum, cold war effort, to contain it. In port, or surfaced, a submarine is vulnerable to a first strike attack, and the Type 092 never moved beyond this stage. The Type 094 is based on the successful Type 093 class, making the likelihood of limited at-sea ops minimal. The value of an SSBN goes up exponentially when it is at sea, regardless of its sound signature. This reasoning is simple, yet not widely discussed. Once at sea there are a limited number of platforms capable of finding and tracking an SSBN on patrol. There is no guarantee that these platforms will actually find the SSBN, only a probability. The more assets and efforts used, the higher the probability of detection and tracking. However, even when tracked, an SSBN is not neutralized: they maintain the ability to launch at least one missile before destruction. Since the JL-2 may be MIRV capable, as many but not all sources suggest, one missile will carry enough destructive power to accomplish Beijing’s intentions.¹⁰⁶ However, to achieve full benefit, China must minimize the probability of detection.

Basic assumptions must be made to correctly assess the level of quieting desired by Beijing for the Type 094. The first assumption is a Chinese belief that the United States will attempt to track the Type 094 when it is at sea. Roy Kamphausen, Vice

¹⁰⁶ One warhead will likely have three too eight MIRVs with decoys and penetration aids. “JL-2 (CSS-NX-5),” *Jane’s Strategic Weapons Systems*, 3 June 2003, www.janes.com (accessed 10 June 2009).

President for Political and Security Affairs at the National Bureau of Asian Research and Dr. Andrew Scobell, formerly from the Strategic Studies Institute for the US Army War College agree,

The combination of close contacts with the Russian navy and the growing body of unclassified studies on Cold War naval operations must have made it abundantly clear to PLA planners that unless PLAN SSBNs can operate undetected by U.S. forces, it would be risky to make substantial investments in a sea-based leg of their nuclear retaliatory capability.¹⁰⁷

To produce a boat on par with Russian quieting standards is likely beyond Chinese industry ability. The Russian program benefited from years of research *combined with* at-sea operations. This basic “hands-on” experience has yet to be gained by the Chinese; coming late to the operational SSBN game will certainly hurt Beijing’s efforts. However, this does not mean that the Type 094 will not be able to elude enemy SSNs. One issue, specifically the U.S.’s (or any competitor’s) ability to track the Type 094, is problematic. The United States was at the peak of its ASW abilities when it tracked Soviet SSBNs; does that ability still exist?

According to Yoshihara and Holmes, “America’s nuclear attack submarine fleet and ASW aviation squadrons—the most potent counters to an undersea threat—have atrophied in numbers, at rates that many believe will take decades to reverse.”¹⁰⁸ This decrease is combined with another reduction: anti-submarine warfare practice. Practice develops the skills necessary to carry out *strategic* ASW. LT Christopher McConnaughy, Chief of Submarine-Launched Ballistic Missile Quality Assurance at the United States Strategic Command, highlights the challenges these skills, “Strategic ASW requires SSNs to shadow SSBNs, to track them continuously, utilizing cues from such sources as satellite imagery, antisubmarine aircraft, and fixed, passive underwater acoustic arrays.”¹⁰⁹

¹⁰⁷ Roy Kamphausen and Andrew Scobell, “Right Sizing the People’s Liberation Army: Exploring the Contours of China’s Military,” Strategic Studies Institute, U.S. Army War College, September 2007, <http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB784.pdf> (accessed 22 February 2009), 512.

¹⁰⁸ Yoshihara and Holmes, 35.

¹⁰⁹ McConnaughy, 90.

This quote emphasizes the difficulties that the United States will face if they attempt to track the Type 094. The United States will receive limited benefits from the “cues” McConnaughey mentions. First, the submarine base on Hainan Island has underwater entry and exit, if China bases the Type 094 from this Island, in port satellite imagery becomes impossible. Second, the aging P-3 Orion fleet, with an average service life of 26 years, has been over tasked with an “airborne battlefield observation platform” conducting mission in both Afghanistan and Iraq.¹¹⁰ These missions, while well within the capability of the airframe, have taken valuable ASW training time away from the pilots. Further, the P-3 is an aged technology. The P-3 replacement, the Multimission Maritime Aircraft (MMA), based on the Boeing 737, will not enter service until 2013. Finally, existing SOSUS arrays, for example the array reported to be close to Diego Garcia, offer only limited detection ability.¹¹¹

Without cues, SSNs will have to carry the brunt of detection and tracking work. Given the previously discussed drawdown in numbers, increased non-ASW missions, and minimal aircraft/array/satellite help the current number of United States submarines may have a difficult time providing numbers to track the Type 094.¹¹² Still, the task of assessing the level of quiet achieved by the Type 094 is very important. The technologies employed could help shape future U.S. technology purchases.

F. CONCLUSION

When the Type 094 class is fully operational, China will have a survivable nuclear strategic deterrent. China will have the opportunity to use this technology in previously unavailable ways, making their worldwide influence increase. It will also bring the opportunity for limited crisis stability. Unlike ground-based weapons, which *visibly* indicate escalation, readying SSBNs during a crisis does not effect negotiations.

¹¹⁰ “U.S. Announces P-3 Orion Replacement: Boeing MMA,” *Associated Press*, 15 June 2004, <http://www.defencetalk.com/forums/archive/index.php/t-1726.html> (accessed 31 March 2009).

¹¹¹ William Burrows, *Deep Black: Space Espionage and National Security*, (New York: Berkeley Books, 1988), 172.

¹¹² The missions of U.S. submarines have grown since the end of the Cold War. Their use as a platform for land attack has limited their ASW practice.

The Type 094 addition allows for a shift from minimum deterrence, employed by a country with questionably survivable nuclear assets, to limited deterrence, where nuclear weapons play a greater role in diplomacy. Great Britain, a country that employs SSBNs alone, has long reaped their benefits, which will soon be shared by the Chinese. Upon first glance, it does not appear that the United States will be ready to face this challenge, give the currently available design aspects and expectations. The Type 094 will be a capable quiet platform with a sound signature near 120 dB. A ballistic missile submarine, on par with the *Los Angeles*-class quieting, will require Cold War level ASW capabilities, an issue taken up in the conclusion. The required extent of these capabilities can only be known when the Type 094 operating patterns are discovered. The following chapter will address the question of how will China employ the Type 094.

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III. TYPE 094 BASING AND NUMBERS

The tactics China uses to deploy the Type 094 are extremely important. The level of threat against the mainland United States depends almost entirely on the distance away from the coastline Beijing is willing send the Type 094. Given the early stage of the Type 094's program development, and the fact that it has never performed a deterrent patrol, careful speculation, based on the program and published reports, is required. A good starting point for this is analyzing whether it is likely for the CPC to deploy the Type 094 conservatively or boldly. Such confidence, built by at-sea training, may embolden Chinese decision makers – making them more likely to pursue deployment and mainland U.S. targeting options that the West is routing against. This “bold” conclusion will entirely depend on a number of decisions the leadership in Beijing will face when the Type 094 comes online.

In order to identify the basing, numbers, and deployment options available to Beijing a specific analysis of each area will provide the best comprehensive review. To accomplish this, the chapter will first address the benefits and disadvantages associated with small and large SSBN class sizes – to find the likely force size Beijing will employ. The chapter will follow this with an examination of the deployment options available for the Type 094: either a bastion style strategy – where they deploy close to home under an air and surface cover, or an open ocean deployment strategy – relying on the Type 094s stealth to hide from potential enemy ASW. And finally, a future target set, focused specifically on the nuclear threat the Type 094 can bring to the U.S. sovereignty, will illuminate the shortcomings of each strategy, or combinations of strategies available to Beijing for use.

A. FUTURE NUMBER ESTIMATES

Numbers play an important part in the success of any weapon, but are especially important for complex weapon systems like submarines. For several reasons, the effectiveness of the Type 094 as a deterrent will be directly related to the number of submarines built. This section will first analyze how a low volume production run of

submarines tend to be hampered by supply and maintenance issues. Second it discusses how the ability to have an SSBN at sea at all times requires at least four submarines; a smaller squadron of boats will inevitably lead to a smaller target/mission set. And finally, a small squadron faces an increased risk from enemy ASW, as the ratio of enemy SSNs to SSBN goes up. For background, this section builds on Ronald O'Rourke's Congressional Research report, which estimates the Type 094's class size to be five or six submarines.¹¹³ These estimates are important, but only a starting point, and warrant analysis to determine if they are correct. When benefits of building five or six submarines versus only two or three (the amount imaged at this time) are compared, the basis for these popular arguments becomes evident.¹¹⁴

The first argument for a Type 094 class size of 5-6 is based on economics. Small class projects, such as the U.S. Navy's Seawolf class SSN, are inherently more expensive *per unit* than large run ships, such as the Los Angeles class SSN. This is for two basic reasons. First, the price of "subsequent" ships decreases as the numbers increase, and second, the price of ship maintenance for a smaller class of ship is higher than for a larger class of ship (per unit). Christopher Drew, a New York Times editor often critical of American shipbuilding and naval procurement, explains how numbers can affect cost initially (for the Zumwalt class destroyers):

Pentagon officials had estimated that the first of the new destroyers, also known as the Zumwalt class, would cost \$3.3 billion, with additional ships costing at least \$2.5 billion each if the Navy had built the 10 that were originally planned...But if only the three are built, independent analysts said, various economies of scale would be lost, and the average cost could rise to \$5 billion or more.¹¹⁵

In addition to initial build expenses, maintenance and part replacement costs for low run platforms are often higher than high run platforms. Due to the "must be ready to

¹¹³ O'Rourke, 120-121.

¹¹⁴ Only two Type 094 "Jin" class SSBNs have been imaged *together* in port. In this image there appears to be a third submarine, although its class is unknown. For the purpose of this thesis, the difference between two and three has little effect on deployment patterns. Until the number reaches four, a constant at-sea presence is not feasible.

¹¹⁵ Christopher Drew, "Contractors Reach Deal on Destroyer," *The New York Times*, 8 April 2009, http://www.nytimes.com/2009/04/09/business/09defense.html?_r=1&demc=eta1 (accessed 8 April 2009).

deploy” nature of submarines, low number platforms often lead to debilitating part sharing. In larger fleets, problem areas are quickly identified and high need parts are mass-produced, reducing the amount of down time pier side. Even in the United States, with their world leading military budget, struggles with this phenomenon. For example, the Seawolf, SSN-21, has been dubbed the “pierwolf” or “building 21” by some submarine sailors, for its tendency to be stuck in port because parts are unavailable or in use on the SSN 22 and 23. Without question, a larger Seawolf class size would increase readiness. Readiness is cumbersome, but can be overcome for SSNs: critical missions can be delegated to other boats if an attack boat is delayed prior to deployment, however, for SSBNs it can destroy their deterrent potential. If the Chinese maintain a fleet of 2-3 Type 094s, it will likely suffer the same issues as the Seawolf class. PLAN forces will likely have to scavenge from one submarine to keep the other running. If this is the case, then it will be impossible for a Type 094 to be at sea at all times.

A second argument, based on a constant at sea presence, is explained in terms of Beijing’s goal for the Type 094. On deterrent patrol, the Type 094’s second-strike ability will greatly bolster the validity of the no-first-use policy. The addition of a new sea-based platform challenges competitors, specifically the United States, to develop new ways to account these weapons. There is a point at which Washington must assume a degree of vulnerability to a Chinese retaliatory strike. This vulnerability tipping point, in terms of SSBNs, is directly proportional to the number of platforms produced. The more platforms China has *at sea*, the greater the likelihood of retaliatory attack. According to O’Rourke, “the U.S. Navy has assessed that China might build as many as five Jin-class submarines in order to provide more redundancy and capacity for a near-continuous at-sea SSBN presence.”¹¹⁶ Given China’s problems with the Type 092, redundancy and *quality* must be a key feature of China’s plans.

Quality control in construction and maintenance will determine if five to six ballistic missile submarines will be *enough* to maintain a constant at sea presence. Keeping an SSBN at sea around the clock is not a simple undertaking. Maintaining this

¹¹⁶ O’Rourke, 120–121.

presence at sea will put an uncommonly large amount of pressure on the Type 094 fleet leadership. This pressure may lead to compromises in quality control and maintenance practices – raising the likelihood of catastrophic at-sea failure.¹¹⁷ In addition, unlike the United States, which goes into “safe mode” by putting all underwater assets into lockdown until the leadership feels problems have been resolved, Beijing may be inadvertently causing the opposite. In the wake of the loss of a Ming class diesel submarine in April 2003, Chinese President Hu Jintao, “urged the People’s Liberation Army to draw a lesson from a deadly submarine accident and *speed up* its modernization drive.”¹¹⁸ Urging the submarine force to “speed up” modernization may not lead to the effect intended.¹¹⁹ While President Hu was likely trying to spur the military community into replacing old technology (such as the Ming class), this push may produce submarines that are developed and produced too quickly – leading to low platform quality standards.

The third and final aspect to any evaluation of fleet size is that numbers are of vital importance in submarine warfare. The first two arguments discussed above focus on the need to maintain one submarine at sea at all times to validate their at-sea nuclear deterrent. Other considerations are also important. Yoshihara and Holmes highlight a different argument for this case:

Assuming 50 percent of the at-sea SSBNs fell prey to enemy ASW—a generous estimate in view of the SSBN capacity for concealment and quiet operations—only two Chinese SSBNs would need to be at sea at any given time to ensure that one survived a first strike. Based on the rotating deployment cycle described above, China would need six SSBNs to fulfill the basic demands of minimum deterrence.¹²⁰

¹¹⁷ Casualty response will be closely examined in Chapter IV.

¹¹⁸ “China’s Hu Says PLA Should Learn from Sub Disaster,” *Reuters*, 4 May 2005, <http://www.dcfp.navy.mil/mc/articles/other/MingSub.htm> (accessed 10 April 2009).

¹¹⁹ This is not to imply that the Chinese leadership are not concerned with safety. The PLAN leadership, ultimately responsible for the Ming accident was seriously reprimanded for their role in the tragedy. This is a trend that is likely to continue, lead to better maintenance practices and fewer at-sea losses.

¹²⁰ Yoshihara and Holmes, 36.

Yoshihara and Holmes 50% survivability rate is likely an approximation given the lull in United States ASW practice and training.¹²¹ It is important to note that if only one Type 094 survives enemy ASW attacks in a time of crisis, China will retain the ability to fire 12 JL-2 missiles in a response to nuclear attack.¹²²

Overall, the benefits of having a fleet of five to six Type 094 submarines with the ability to maintain a constant at sea presence are clear. As discussed, the cost per submarine decreases with every new submarine in the class, with needed maintenance parts become more common in the supply chain. Greater numbers also increase the Type 094's viability because it will be able to maintain a constant at-sea basis. Or, if a bastion strategy is used, multiple ballistic missile submarines can be used to overwhelm lurking SSNs. However, the likelihood of maintaining that presence is nearly non-existent at this time. In the future this may not be the case, once more platforms are built and new-build issues have been sorted out with the Type 094 and JL-2. Because of this, it is likely that Beijing will deploy the Type 094 in two different ways in its lifetime; it will start with a bastion strategy, and when platforms are available, transition to a constant at-sea presence. The next section takes up that discussion.

¹²¹ These shortcomings were discussed in detail at the end of Chapter II.

¹²² There is speculation on whether or not the JL-2 missile will incorporate Multiple Independently Targetable Reentry Vehicle (MIRV) technology. While this type of development is important to consider, for this discussion the destructive power threat of just 12 JL-2 missiles is overwhelming in most regards. Andrew Scobell and Larry M. Wortzel, "China's Growing Military Power: Perspectives On Security, Ballistic Missiles, and Conventional Capabilities," Strategic Studies Institute, U.S. Army War College, September 2002, <http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB59.pdf> (accessed 22 February 2009), 149.

B. DEPLOYMENT TYPE

Currently, with only two or three Type 094 submarines in service, Beijing will likely deploy a bastion strategy when the JL-2 missile is ready for use.¹²³ This strategy was developed and employed by the Soviet Union, worried that superior United States ASW assets had the ability to track and destroy Soviet SSBNs *prior to nuclear launch*. This strategy involved placing SSBNs in “pens” and protecting them with aviation and sea-based assets. A second option would utilize “open-ocean” deployment. A constant at sea presence makes this option viable – by increasing the likelihood that enemy SSN’s will not shadow the Type 094 when it is traveling out of port. This section will explore both options, however it will primarily focus on the bastion strategy since 1) it is the only viable option available to Beijing with 2-3 SSBNs and 2) since there has already been some “practice” for coordination this strategy requires.

Bastion-deployed SSBNs maintain their ability to fire-pier side in peace, and can transition to a protected at-sea sea location in times of crisis. According to Richard O. Fanjoy, an associate professor of Aviation Technology at Purdue University, “These bastions, in the Sea of Okhotsk and the Bering Sea, provide ideal cover for Delta IV and Typhoon boats that can either operate under the Arctic ice pack where aircraft and surface fleets can’t get at them or stay below an umbrella of Soviet air and ASW

¹²³ Some analysts believe that the JL-2 is plagued with problems and running behind schedule. This belief seems to stem from an article written in 2004 for the Washington Times by Bill Gertz where he reported that “U.S. intelligence officials said the Chinese suffered a setback in their JL-2 missile program when a test flight of the JL-2 missile failed over the summer. The JL-2 missile program was delayed by the test failure but is continuing to be developed, the officials said.” While the test in the summer of 2004 may have been a failure, in no way should it be inferred that the JL-2 is not fully operational. This failed test was the third in a series of four. Unlike the United States, it seems as if the 2nd Artillery only tests their ballistic missiles a small number of times. For example, the JL-1 only had 3 test flights in 1985 before coming operational in 1987. Overall, given the successful test in 2005, it is likely that the JL-2 is near ready for use. Bill Gertz, “China Tests Ballistic Missile Submarine,” *The Washington Times*, 3 December 2004, <http://www.washingtontimes.com/national/20041202-115302-2338r.htm> (accessed 16 April 2009). A planned launch was reported in September 2001, but this was cancelled. The first launch was made from the trials submarine in August 2002, with a reported range of 6,000 km. A second flight test was made in 2003, a third in August 2004, and a fourth in May 2005. *Jane’s Strategic Weapon Systems* - JL-2 (CSS-NX-5).

protection.”¹²⁴ China will not have an under ice deployment option; they will have to stay under an “umbrella.” Lyle Goldstein argues for the possibility of a Chinese bastion strategy, “It can be said the Soviet ‘bastion strategy’ might have applicability to China, even if the Chinese system of layered defenses is more focused on proximate territorial disputes than nuclear operations.” Unless Beijing develops 3-4 more Type 094s before the JL-2 comes online, then there is little doubt that a bastion strategy will be applicable to China.¹²⁵ However, a bastion strategy, centered on either the Yellow Sea (Qingdao) or Gulf of Tonkin, will allow Beijing to safely utilize a small number of Type 094s, but it comes with a list of shortcomings that Beijing must plan to overcome.¹²⁶

A bastion strategy comes with inherent problems. First unlike a hidden, always on station SSBN, the bastion strategy requires additional forces to remain viable. Victor Mizin and Michael Jasinski, researchers at the Center for Nonproliferation Studies (CNS), Monterey Institute of International Studies explain, “During the Cold War, the Soviet Union felt compelled to dedicate considerable effort to construct a large surface fleet that would protect the ‘SSBN bastions’ against NATO naval task forces.”¹²⁷ Not only does it take a large amount of naval forces, often in high demand in a crisis, a bastion strategy also requires a great deal of coordination.

While these considerations are important, nevertheless, it appears as though China is already planning for this:

In mid-November 2007, the PLAN held a complex set of exercises which featured the use of new ships and missiles. Located largely in the South China Sea near Hainan Island and the Paracel Island group, this exercise was a rare joint South Sea Fleet and East Sea Fleet endeavour ... This

¹²⁴ Richard O. Fanjoy, Lt Colonel USAF, “U.S. Forward Maritime Strategy and Soviet SSBNs: Optimum Targeting or Escalatory Dilemma,” A paper for Military Strategy Seminar I. National War College, 9 April 1990, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA437400&Location=U2&doc=GetTRDoc.pdf> (accessed 10 June 2009).

¹²⁵ This is not to say that China will not employ a unique version of a “bastion” strategy, different from the Soviet Union style. Regardless, there are two options for SSBN deployment, a constant at sea presence and a surge doctrine (bastion).

¹²⁶ Both the Qingdao and Gulf of Tonkin bastion advantages and shortcomings are discussed at length in section C: Possible home base locations and target speculation.

¹²⁷ Victor Mizin and Michael Jasinski, “The Future of the Russian Sea-Based Deterrent,” *The Journal of Slavic Military Studies*, vol. 16, no. 1 (July/September 2003), 82.

exercise also coincided with the first movement of the new Type 094 SSBN to its new base near Sanya on Hainan Island, perhaps indicating that one of the goals of this exercise was to develop doctrine and tactics to support SSBNs.¹²⁸

Second, even if the tactics are sound, the operations are very costly. This is the second problem with the bastion strategy; it is very expensive. Kamphausen and Scobell argue that the Type 094 “would become a resource black hole if the PLA had to create a Soviet-like “bastion” defense to protect them.”¹²⁹ The Soviet Union relied on this bastion strategy in the height of the Cold War. They were aware that their SSBNs were vulnerable to American SSNs, deployed the “most modern of [their] surface forces ... charged with supporting Soviet SSBNs.”¹³⁰ The Soviets defended their bastion with a full range of naval forces in layers. The inner layer contained SSN's patrolling within the bastion. In the next Surface Action Groups, (SAGs) with several heavy combatants patrolled at the perimeter providing aggressive ASW against any and all sub-surface contacts. Further, land based naval patrol aircraft supported ASW and Defensive Counter Air (DCA) was provided by fighters. All four of these options were exercised regularly. China, if they decide on a bastion strategy, must also expend a great deal of their surface force effort to meet the modern Anti-American SSN challenge. Complex training exercises, like the one held in November 2007, are the first costly step in bastion strategy implementation.

The third and final bastion strategy shortcoming is its inherent escalatory nature. If Beijing is in a crisis with another country, and it deploys its SSBNs (even for a routine or training mission), it is likely that the competing country will see this as an escalatory act. China, with its ingrained no-first-use policy, has refrained from using nuclear weapons in an escalatory or threatening manner, since the successive tests in 1969. Other countries may perceive the deployment of weapons as a signal that Beijing is departing from its policy of no-first-use, something that Chinese leadership will likely not risk. It is

¹²⁸ “China and Northeast Asia: Navy, China,” *Jane’s Sentinel Security Assessment*, 3 February 2009, www.janes.com (accessed 10 April 2009).

¹²⁹ Kamphausen and Scobell, 512.

¹³⁰ Kenneth R. McGruther, *The Evolving Soviet Navy*, (Newport: Naval War College Press, 1978), 54.

possible that Beijing may employ some sort of at-sea scheduling for the Type 094, to limit its time in port and deter this appearance of escalation. However, this will greatly limit the Type 094's effectiveness, especially if China must wait until a scheduled time to deploy this asset in a time of crisis. (The Type 094 provides new capabilities for nuclear signaling in a crisis.)

China has a unique option, unavailable to the Russians, due to the underwater sea base at Hainan Island. Beijing may be able to covertly deploy the Type 094 in a time of crisis, as there will be no indication observable to satellites, a traditional *modus operandi* in this case, that the Type 094 has left port. However, this deployment tactic is not without fault, in order to be viable, the entrance and exit would have to be done at dark (figure 4). The navigational hazards of conning a large submarine through a small entrance, with limited tugboat support at night would be a difficult lengthy process.¹³¹

¹³¹ According to www.military-today.com the Type 094 is 133 meters long. This would make the width approximately 11 meters wide. According to the Federation of American Scientists the opening to the submarine cave at Hainan Island is 16 meters wide. This would give approximately 7 feet of clearance on each side of the Type 094 if it were to transit the tunnel. "Jin Class: Ballistic Missile Submarine," *Military-Today*, http://www.military-today.com/navy/jin_class.htm (accessed 10 June 2009); "Yulin (Sanya) Naval Base: Hainan Island, China," Federation of American Scientists, DigitalGlobe ©2008; JPG, <http://www.fas.org/programs/ssp/nukes/images/Hainan-full.jpg> (accessed 1 April 2009).

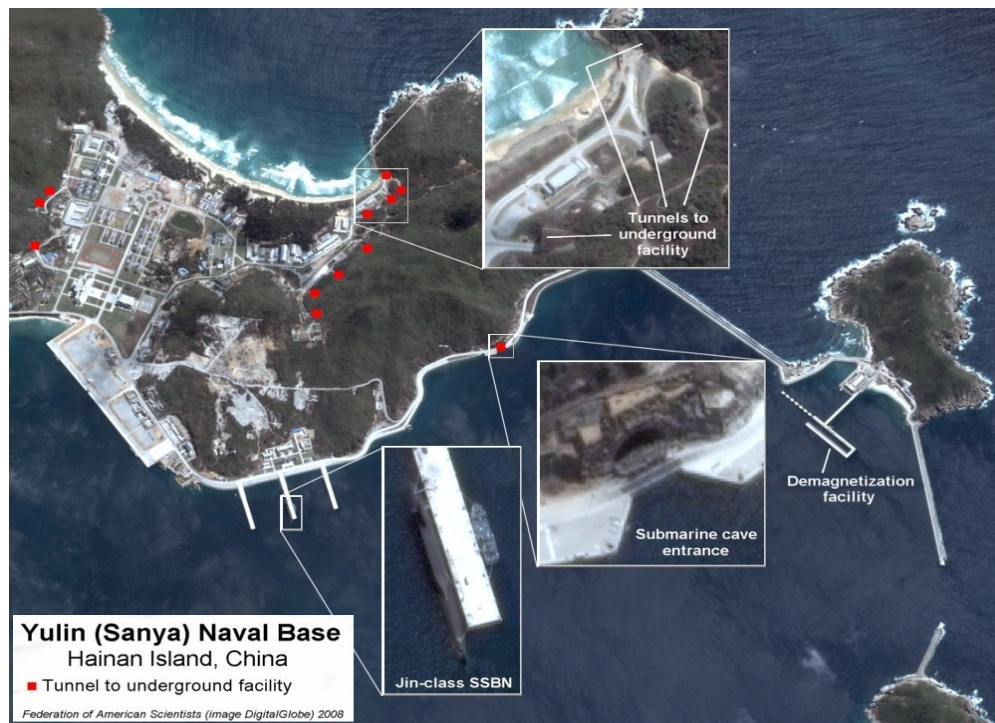


Figure 4. Hainan Island Base¹³² Source: www.fas.org

China would also lose the ability to launch the JL-2 pier side, minimizing the effectiveness of the Type 094 in a crisis environment. The underground base also suffers from a chokepoint (the small underground entrance), which would be easily destroyed by an aggressor in time of a crisis. In addition, if Beijing decides to utilize a bastion strategy, when Type 094 deploys from Hainan, it would still require surface escorts (and the associated cost of fuel, personnel and wear associated with bastion operations). Hainan Island is also not situated in the ideal location; it greatly reduces the Type 094's targeting choices.¹³³ Overall, the deployment of the Type 094 from underground is a large risk for Beijing to take.

Despite these bastion strategy shortcomings, when available as an asset, Beijing will likely deploy the Type 094 in a constant, at sea basis. This approach has advantages over the bastion strategy. First, additional forces, and their coordination, are not

¹³² "Yulin (Sanya) Naval Base: Hainan Island, China," Federation of American Scientists.

¹³³ The JL-2's range limitations and likely bastion locations, Qingdao and Gulf of Tonkin, are discussed at length in section C: Possible home base locations and target speculation.

required.¹³⁴ If a submarine is in a bastion with surface and air protection, the location of the submarine can be narrowed down to a small, ASW manageable location. For an SSBN, to “hide with pride” is always the *easiest* strategy. In addition, a platform that can hide effectively has the ability to travel outside of localized bastions. Kamphausen and Scobell briefly explain these added benefits:

The PRC [would] take advantage of the vastness of the open ocean to enhance the survivability of its nuclear deterrent against the United States and potentially circumvent U.S. missile defense by being able to launch intercontinental ballistic missiles (ICBMs) from submarines along azimuths outside the engagement zones of antiballistic missile (ABM) systems.¹³⁵

The most significant benefit gained for China, from a constant at-sea strategy, is the ability to peacefully interact with other countries in crisis situations without the risk of nuclear escalation. For clarification, a bastion strategy would alert China’s competitor to a rise in the “stakes.” Specifically, Beijing, by deploying the Type 094 (and associated surface protection) during a crisis, would increase the likelihood of the nuclear option. This type of signaling is unavoidable in a bastion strategy, however it is the key benefit of a constant at-sea strategy. A constantly at-sea SSBNs can go “on alert” without alerting Beijing’s competition, negotiations can continue without escalation.

It is unclear when China will be able to maintain the Type 094 constantly at sea. Some analysis believes that even when China has this ability, it may break away from the mold and pursue a different avenue. Yoshihara and Holmes argue for a hybrid:

Chinese may keep their options open, alternating among them as security conditions warrant. For example, Beijing may be content to rely on a bastion strategy during peacetime, when no immediate threat is evident. In

¹³⁴ Beijing may choose to deploy the Type 094 with an attack boat shadow or screen. This would have an adverse affect on the Type 094 stealth as two boats would be easier to find than one.

¹³⁵ Kamphausen and Scobell, 512.

times of conflict, it may permit more active coastal patrols or slip its SSBNs into open waters to signal resolve or counter nuclear coercion from an adversary.¹³⁶

However, this argument is based on the belief that in a crisis China will have the ability to “slip” an SSBN into open waters. If that crisis is with a country with a viable SSN force, such as the United States, the ASW tracking risk becomes very high. If an adversary has the knowledge of impending SSBN deployment, it is likely they will do everything to track and neutralize it. China adopting a peacetime deployment routine, to an unknown location is the most viable way to ensure second-strike capability.

C. POSSIBLE HOME BASE LOCATIONS AND TARGET SPECULATION

Determining the basing locations of Type 094s requires dynamic estimation. There is a great likelihood that the basing will change as additional Type 094s are commissioned. Because of this, the basing of the Type 094 should be considered for each separate deployment type. Due to location, likely targets become apparent based on the JL-2s estimated range.¹³⁷ For the purpose of the arguments posed in this chapter, the assumed range of the JL-2 missile will be set at 8,000km (4320 miles). This range is used for two reasons, first the JL-2 is relatively untested and therefore the estimate used in the 2007 China’s Military Power annual report to Congress is a widely accepted approximation. And second, even if the JL-2’s range is closer to 12,000 km as some estimate, it is unlikely that Beijing would be willing to employ this weapon close to its maximum range. This type of employment would increase the likelihood of system failure, associated with operating weapon systems near their limits. Figure 5 is a map with range estimates for various Chinese weapon systems. This will provide an adequate starting point for discussion on the effect that location will have on the Type 094’s credibility and effectiveness.

¹³⁶ There is another cost associated with this type of strategy. The submarine force (and associated surface forces) would have to train for two separate missions. One would be learning how to work closely with surface operations; the other would be using stealth to hide from aggressor ASW forces. Yoshihara and Holmes, 37.

¹³⁷ According to Janes, the actual maximum range of the JL-2 is not known. The estimates range from 7,200km (4474 miles) to 12,000km (7456 miles). *Jane’s Strategic Weapon Systems - JL-2 (CSS-NX-5)*.

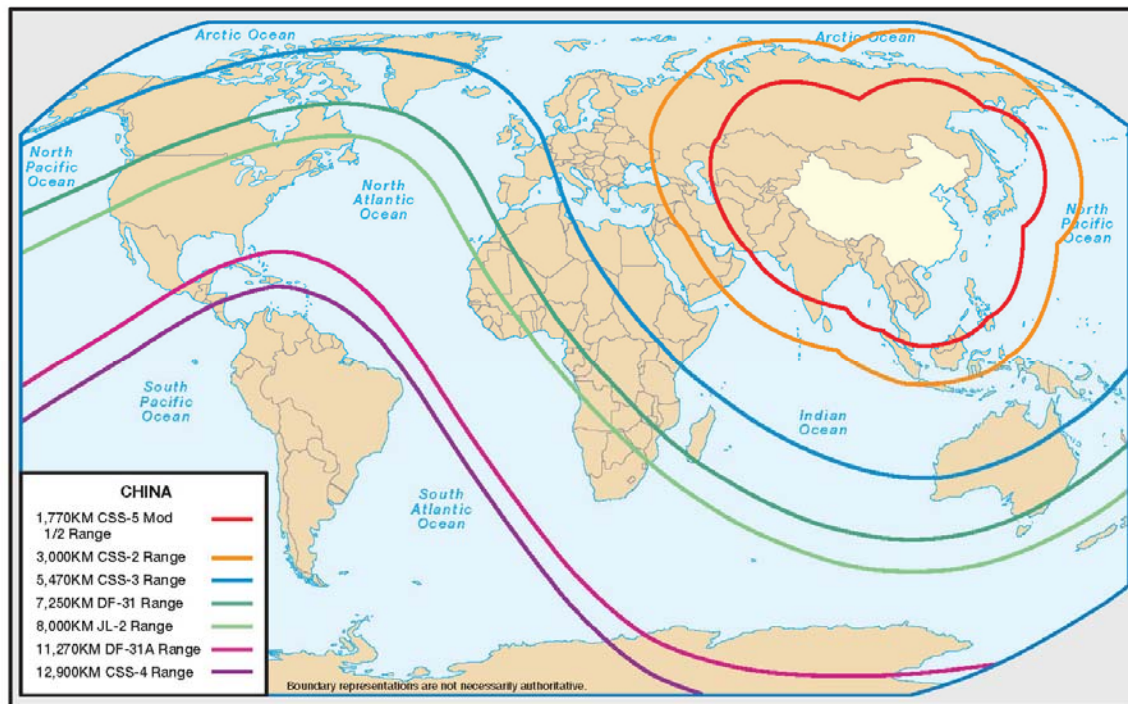


Figure 5. China Missile Rangers¹³⁸ Source: www.defenselink.mil

Upon initial review, it seems as if the JL-2 will hold portions of the continental United States at bay when it is employed. However, the range rings for the various missile systems are based on a China centered location, inapplicable for the sea-based Type 094. Updating the chart, based on expected basing and deployment locations, will provide a better basis for analysis.

As previously alluded to, there are good indications that China is preparing to deploy the Type 094 from Hainan Island to a bastion south of the Gulf of Tonkin. This conclusion is based on available open source reports. First, as shown in Figure 1, the

¹³⁸ *Annual Report to Congress: Military Power of the People's Republic of China 2007*, (Image copied from PDF.) Department of Defense, 2007, <http://www.defenselink.mil/pubs/pdfs/070523-China-Military-Power-final.pdf>. (Accessed 14 April 2009), 19.

Type 094 has already been imaged at the Yulin Naval Base.¹³⁹ Second, the November 2007 Chinese naval exercise, which reportedly included the Type 094, occurred near this location.¹⁴⁰ And finally, the Gulf of Tonkin, due to its nature as a gulf, provides a protected area ideal for a bastion. However, the Gulf of Tonkin does have disadvantages, and the first of these is based on the expected range of the JL-2.

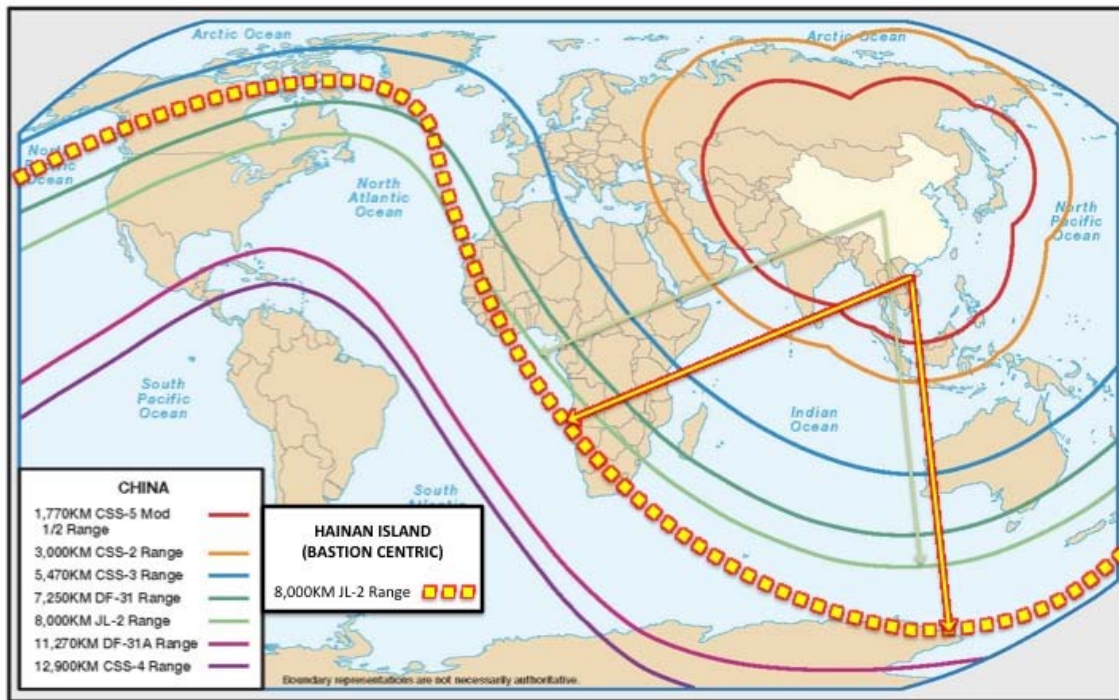


Figure 6. JL-2 Range Adjusted for Hainan Bastion¹⁴¹ Source: www.defenselink.mil

Figure 6 illustrates the problem of having a bastion strategy centered on Hainan Island. Although the figure is only intended to show general ranges, based on an expected JL-2 range of 8,000 km, it still clearly shows the problem with a bastion located

¹³⁹ According to Hans M. Kristensen, “The first boat was launched in 2004 and first disclosed by FAS in July 2007 at Xiaopingdao Submarine Base Submarine Base near Dalain via a commercial satellite image taken in October 2006. Another satellite image taken in May 2007 and first described in October 2007 showed two partially assembled Jin-class SSBNs at Bohai Shipyard near Huludao. Whether China at that point had launched two or three boats remains unclear.” Hans M. Kristensen, “Type 094 (Jin-class) SSBN,” Federation of American Scientist, The Nuclear Information Project, 24 April 2008, http://www.fas.org/nuke/guide/china/slbn/type_94.htm (accessed 7 June 2009).

¹⁴⁰ *Jane's Sentinel Security Assessment - China And Northeast Asia: Navy, China.*

¹⁴¹ Original ranges based on center of China. Image edited by author. Original image produced for *Annual Report to Congress: Military Power of the People's Republic of China 2007.*

near Hainan and the Gulf of Tonkin. The JL-2 will not be able to threaten sites in the continental United States. However, it may be able to threaten sites in Alaska and Hawaii; a smaller but still credible threat. A good question to ask may be whether the United States is willing to trade Taipei for Honolulu? Overall, a bastion strategy near Hainan Island is initially very likely. For the initial deployments of the Type 094, China may be willing to forgo the ability to attack the continental United States (while threatening U.S. allies and territories, specifically Japan, Guam, and South Korea) in order to perfect the training and employment of a bastion strategy. If Washington does not feel threatened by the Type 094, then it is less likely resources will be allocated to track it.

David Isby, a Jane's Information Group submitter, sees the Type 094 being based in places other than Hainan:

According to unconfirmed press reports, China's nuclear ballistic missile (SSBN) submarines are based with the 1st Submarine Flotilla of the North Sea Fleet, located near Qingdao in Shandong Province ... the base includes hardened cave-type submarine pens and five berths. A dock with a crane suitable for missile loading has also been built, while the infrastructure includes hardened missile storage and large buildings, possibly for missile checkout and assembly.¹⁴²

This is a strong argument for this location. Employing multiple bastions will give Beijing deterrent flexibility, however the cost of this type of deployment and the availability of defensive surface assets is questionable. This allows the ability to keep regional competitors in check while threatening (although minimally) areas of the United States. Figure 7 gives JL-2 range estimates for a Yellow Sea (Qingdao) bastion. By using this Department of Defense chart, modified for a Yellow Sea bastion, it is evident that all of the major urban areas on the Western seaboard are threatened. From a defensive point of view, the Yellow Sea offers the best bastion setting. It is shallow, easy to defend, and clearly in China's territorial waters.

¹⁴² David C. Isby, "China's SSBN is based with 1st Submarine Flotilla near Qingdao, claim reports," *Jane's Missiles and Rockets Information Group*, 1 Nov 2006, www.janes.com (accessed 14 April 2009).

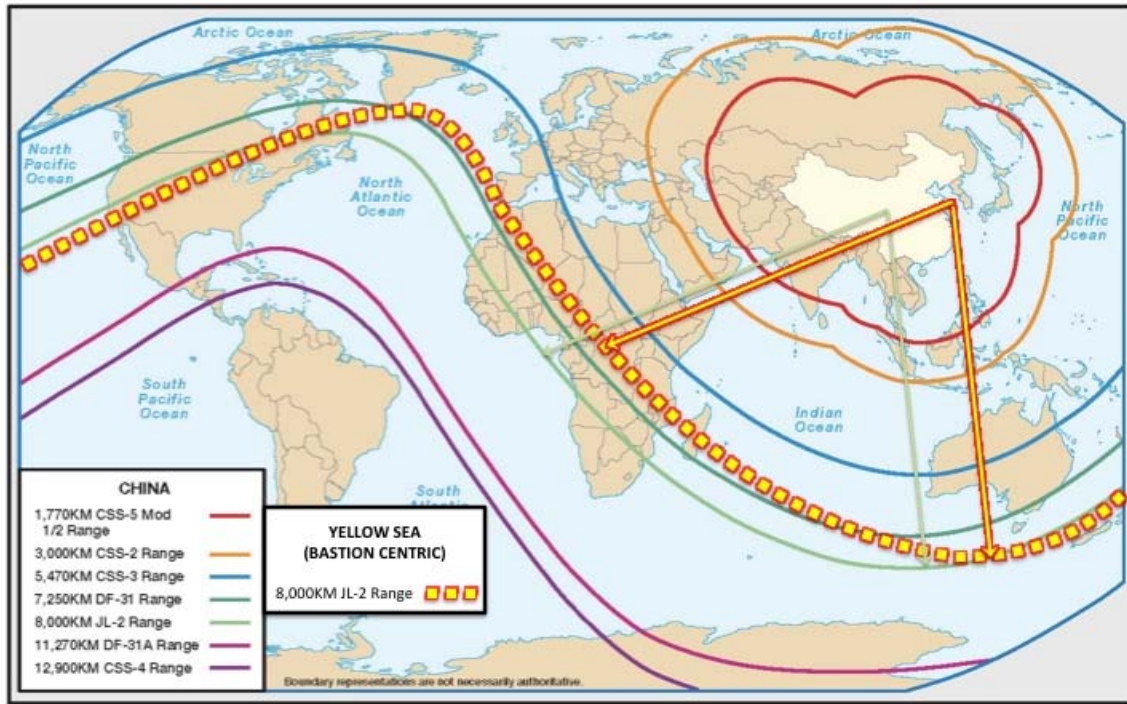


Figure 7. Range Adjusted for Yellow Sea Bastion¹⁴³ Source: www.defenselink.mil

It is clear that the Yellow Sea and Hainan Island are likely bastion locations, however both have distinct disadvantages. First, attacking continental United States targets in either case would likely require Russian airspace over-flight. Given the discussion in chapter 2, a strategic competitor such as Russia may not be willing to allow this course of attack. Second, operation of ballistic missiles at their maximum range increases the likelihood of failure. An increase in the failure of a second strike weapon begins to negate China's nuclear deterrence validity. Given these shortcomings, it becomes apparent that the Type 094 may be employed in deep-water open ocean settings.

Employment of the Type 094, outside of China's regional waters, is the most logical course of action for Beijing. Practicality may win out over logic, as the risk from enemy SSNs goes up considerably if the Type 094 travels outside of regional waters. O'Rourke contends that, "The future mission of the [Type 094] appears to be regional because the range of the missiles and operational constraints facing the submarines limit

¹⁴³ Original ranges based on center of China. Image edited by author. Original image produced for *Annual Report to Congress: Military Power of the People's Republic of China 2007*.

the targets that can be held at risk.”¹⁴⁴ This deduction may prove to be inaccurate, given the technological advancements that have led to an exceptionally quiet capable platform. O’Rourke does give some consideration to further out deployments:

Assuming they made it out of port past lurking U.S. attack submarines, the Chinese missile submarines would have to sail through the narrow straight between South Korea and Japan into the Sea of Japan for its Julang-2 missiles to be able to strike the Seattle area.¹⁴⁵

This line of reasoning, while sound just a few short years ago, does not account for the recent PLAN developments. The Song class submarine, which surfaced near an American carrier, shows that Beijing may not “fear” American submarines. While the trailing of a loud contact in a peacetime environment, with questionable SSN support may seem to have little implication in this case, it goes to show that their will be submarine captains with a large amount of experience against American assets. An SSBN will never challenge a platform with known escorts, and will be traveling at far slower speeds, eliminating most of their sound signature. If China chooses, the Type 094 is quiet enough to venture southeast of Japan, to an area capable of targeting the continental United States. Assuming Beijing will not make this decision would be a mistake by American analysts.

Open water deployments will not happen until the JL-2 is fully tested and in service. Some analysts believe that the JL-2 is plagued with problems and running behind schedule. This belief seems to stem from an article written in 2004 for the Washington Times by Bill Gertz:

U.S. intelligence officials said the Chinese suffered a setback in their JL-2 missile program when a test flight of the JL-2 missile failed over the summer. The JL-2 missile program was delayed by the test failure but is continuing to be developed, the officials said.¹⁴⁶

¹⁴⁴ O’Rourke, 120–121.

¹⁴⁵ Ibid.

¹⁴⁶ Bill Gertz, “China Tests Ballistic Missile Submarine.”

While the test in the summer of 2004 may have been a failure, in no way should it be inferred that the JL-2 is not fully operational. This failed test was the third in a series of four.¹⁴⁷ Unlike the United States, it seems as if the 2nd Artillery only tests their ballistic missiles a small number of times. For example, the JL-1 only had 3 test flights in 1985 before coming operational in 1987.¹⁴⁸ Overall, given the successful test in 2005, it is likely that the JL-2 is near ready for use.

D. CONCLUSION

Beijing has many deployment options available for the Type 094. These options primarily hinge on the numbers Beijing develops and deploys. Overall, a class size of five to six ships will give Beijing a distinct advantage. These advantages come in three different avenues. First, there are economic factors: the larger a run of ships in a class the lower the cost. Second, given China's adherence to a no-first-use doctrine, a larger run of ships will allow for a constant at sea presence, eliminating the perceived nuclear escalatory "steps" taken if China deploys the Type 094 in a crisis mode. And finally, if China can maintain a larger Type 094 force, and employ multiple Type 094s they can double their survival rate against western SSNs.

A class of 5-6 submarines, with the ability to conduct blue-water operations, is likely Beijing's goal. However, this force size is multiple years away. Because of this, in the interim, a bastion strategy is currently the most likely near-term deployment option. China will encounter difficulty with bastion coordination, and incur a large expense due to the amount of forces necessary just to employ one SSBN. Exercises, similar to the one conducted in November 2007, will increase Beijing's chance for success. However, multiple exercises will be needed to approach the level of proficiency necessary to protect an SSBN from aggressive SSNs (especially modern Virginia class boats). All of the risk cannot be mitigated; the nature of a bastion strategy makes it dangerous for the

¹⁴⁷ A planned launch was reported in September 2001, but this was cancelled. The first launch was made from the trials submarine in August 2002, with a reported range of 6,000 km. A second flight test was made in 2003, a third in August 2004, and a fourth in May 2005. *Jane's Strategic Weapon Systems – JL-2 (CSS-NX-5)*.

¹⁴⁸ *Jane's Underwater Warfare Systems – JL-2 (CSS-N-3)*.

PLAN. Some mitigation is occurring; the increased number of exercises are indicative of added attention throughout the PLAN, which leads to doctrinal development and the testing of communications networks. A bastion strategy, by design, gives up an SSBN's general location and creates the perception of an escalatory nuclear step. Beijing must carefully weigh these factors before employing the Type 094 in a crisis situation.

China will have the ability to use both the Hainan and Yellow Sea as bastions. Given the current activity and the presence of submarine facilities, it is likely that both bases will be used. If Beijing chooses to use the underground facilities at Hainan Island it will not be an easy task. Both of these bastions, if the target is the United States, suffer from two problems. First, most continental United States cities can only be reached by flying the JL-2 over Russia. And second, employing the JL-2 to its maximum range may bring reliability issues. Once properly trained and when greater numbers are available, the Type 094 will have the opportunity to deploy to the open ocean, making it much more versatile. China may be willing to deploy the Type 094 through the narrow chokepoint into the Sea of Japan; however, this is a risky move. A more likely open ocean location is southeast of Japan, through an avenue north of Taiwan. This will provide maximum deterrence against the entire continental United States, with minimal danger to the platform. However, this discussion of the Type 094 is based on the assumption that the JL-2 will come online in the near future.

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IV. IMPLICATIONS OF THE TYPE 094 ON CHINA'S NO-FIRST-USE POLICY

Beijing will soon operate an advanced deterrence platform, with the ability to carry multiple warheads (from 12-48), outside their land boundaries. This accomplishment may contradict China's nuclear tradition: employing only a "small number of nuclear weapons entirely for self-defense."¹⁴⁹ The Type 094 submarine cannot be viewed as the simple evolution of weapon system technology over time. It is a significant addition to and diversification of China's nuclear arsenal and thus warrants a close look at how nuclear platforms affect China's nuclear policy. The no-first-use policy—principally unchanged since 1964—will incorporate the Type 094 in the near future. Reviewing the history, purpose, and limitations of Beijing's nuclear policy will help better understand the policy changes required to incorporate the Type 094 submarine.

This review must answer a number of questions to offer adequate explanation of the Chinese change in policy. First, why did Beijing initially develop nuclear weapons and the no-first-use policy? Historically, the goal of the Chinese no-first-use policy has been to prevent a nuclear attack by promising a retaliatory attack against one of the aggressor's cities. The nuclear payload of the Type 094, with at least twelve nuclear weapons, appears to be leading to a policy-capability mismatch. Second, is the no-first-use policy outdated and unable to adequately provide for China's defense? (There are modern challenges to the validity of the no-first-use policy, primarily missile defense and precision weapons.) Third, under China's implementation of the no-first-use policy, control of nuclear weapons is held at the highest level. How much of this is the Communist Party willing to delegate in the time of a crisis? Finally, is the no-first-use policy strategically limiting Beijing, not only in terms of the full use of the Type 094 capabilities, but also making it impossible to adequately respond to an at sea casualty?

¹⁴⁹ *White Paper: China's National Defense in 2000*. (People's Republic of China, Information Office of the State Council in Chapter II: National Defense Policy, October 2000).

While the PLAN will face certain challenges incorporating the Type 094 into the 2nd Artillery's doctrine, a publicly announced change to the no-first-use rhetoric is *very unlikely*.

A. HISTORY

China's first successful test of a nuclear weapon occurred on October 16, 1964. Following the test Beijing released this statement. "The Chinese Government hereby solemnly declares that China will never at any time or under any circumstances be the first to use nuclear weapons."¹⁵⁰ This statement is straightforward, and provides the backbone for the no-first-use policy. China's nuclear strategy and nuclear forces were initially structured around this policy. This initial policy has overarching themes that are applicable in a study of modern SSBNs. First, the primary reason China developed nuclear weapons was "to break the nuclear monopoly of the nuclear powers and to eliminate nuclear weapons."¹⁵¹ Second, Chinese no-first-use policy is a guiding principle - it is a vital part of Chinese nuclear tradition. Third, a small force is all that is necessary, and this small size reflects the no-first-use policy. Finally, this strategy has very little need for flexibility, as it only has one objective, i.e., the capability to destroy some cities after the initial nuclear attack to deter the aggressor.

1. Chinese Nuclear Weapons Purpose

In 1971, Chiao Kuan-hua, Vice-President of the Chinese People's Institute of Foreign Affairs, Vice-Minister of the Chinese Foreign Minister exclaimed to the UN General Assembly, "It is impossible to expect the other countries, which are subjected to the threat of the two nuclear powers, not to develop nuclear weapons for the purpose of self-defense."¹⁵² Therefore, according to Beijing, China was *forced* to develop and

¹⁵⁰ "Statement of the Government of the People's Republic of China," James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, 16 October 1964, <http://www.nti.org/db/china/engdocs/nucsta64.htm> (accessed 20 April 2009).

¹⁵¹ Ibid.

¹⁵² "Chiao Kuan-hua's Speech at the UN General Assembly," James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, 24 November 1971, <http://www.nti.org/db/china/engdocs/ch1171.htm> (accessed 20 April 20).

deploy nuclear weapons. If the world powers had followed China's advice initially, all nuclear weapons would have been destroyed and there would have been no need for the Chinese atomic test in 1964.¹⁵³ Beijing's acquisition of nuclear weapons was purported to ultimately achieve this purpose. According to Chiao, China needed to "[break] the superpowers' nuclear monopoly and finally [eliminate] nuclear weapons."¹⁵⁴ China had good reason to feel this way, given the recent threats by the United States to use nuclear weapons if Beijing moved against Taiwan. The Eisenhower administration overtly asserted that they "considered atomic weapons interchangeable with the conventional weapons in the American arsenal."¹⁵⁵ In 1955, China had no answer to Eisenhower's threat. Therefore initially, Chinese weapons were meant to break a monopoly, to ensure that they could provide for their own defense. But ultimately Beijing hopes that they can eventually destroy all of their nuclear weapons when the need for them is no longer present. By providing a minimal amount of deterrence, China is able to focus on pushing for the incorporation of the no-first-use and eventually nuclear weapon elimination policy by other nuclear powers.

Why is China pushing this agenda? Chinese rhetoric is bent on convincing the world that Beijing's nuclear policy is designed to encourage a "nuclear-free" world. However, the no-first-use policy is partially a result of necessity, not simply good intentions. China lacks the nuclear arsenal to win a nuclear fight with either Russia or the United States. If they were to initiate a nuclear *attack* against either of these powers they would be quickly overwhelmed. As discussed in Chapter Two, there was a good chance that if China even indicated they were thinking of launching a weapon, many of their nuclear weapons would be destroyed, severely limiting their long-range destructive potential. China's no-first-use policy promises that one city would be destroyed in

¹⁵³ As early as July 31, 1963, the Chinese Government issued a statement advocating the complete, thorough, total and resolute prohibition and destruction of nuclear weapon. "Chiao Kuan-hua's Speech at the UN General Assemblé."

¹⁵⁴ Ibid.

¹⁵⁵ Gordon H. Chang summarizing the Dulles memorandum, meeting with Eisenhower, March 6, 1995 (Dulles Papers, White House Memoranda, Box 3, Meetings with the President 1955). Gordon H. Chang, "To the Nuclear Brink: Eisenhower, Dulles, and the Quemoy-Matsu Crisis," *International Security*, vol. 12, no. 4 (Spring 1988), 106.

retaliation. This policy was initially designed under resource constraints not anti-nuclear sentiment; Beijing only possessed nuclear forces with the ability to retaliate against one, maybe two cities. In addition, a minimalist strategy makes China appear to seek a nuclear weapon free world. Russian and American nuclear weapons elimination, supporting this appearance, greatly benefits a nuclear-weak China. If the world disarmed, China's relative power would *increase*. China, a state with relatively few nuclear weapons, becomes more powerful with every nuclear weapon Moscow and Washington dismantles and destroys. In 1998 Ambassador Qian Jiadong, permanent representative of the People's Republic of China to the UN Office at Geneva, eloquently stated why China should not disarm:

The lesser nuclear weapon states, Britain, France and China, naturally have to join in the reduction process as well, but apparently it would be unrealistic to require them to do so right now, considering the great disproportion between the sizes of their arsenals and those of the US and Russia.¹⁵⁶

While the claim by Ambassador Qian sounds reasonable, it is still important to note that China is willing to work to decrease this disproportion, either by encouraging the elimination of Washington and Moscow's arsenals, or building more weapons of their own. This imbalance in nuclear weapons among China, Russia, and America, is slowly going down. However, the difference in nuclear weapon stockpiles is large. Until this changes significantly, Beijing's nuclear weapons program will continue to serve primarily defensive needs. The no-first-use policy is at the core of this defense. With a historically limited arsenal, China can only promise reactive defense.

2. Guiding Principle or Evolving Doctrine

With the incorporation of a viable SSBN, China's nuclear arsenal will increase in effectiveness. This capability and policy mismatch will require Beijing to decide whether or not to pursue a change to their no-first-use policy. This will not be a simple change to

¹⁵⁶ Ambassador Qian Jiadong, "Eliminating Nuclear Weapons: China's Policy," Letter available at the James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, 7 November 1998, <http://www.nti.org/db/china/engdocs/qjd1198.htm> (accessed 20 April 2009).

strategy, and, if it occurs at all, it will likely never occur publicly. The importance of the no-first-use policy is likely greater than any military strategy in China. Pan Zhenqiang, a retired Major General in the PLA Army and currently a professor at the Institute of Strategic Studies at the National Defense University in China, argues one reason why the no-first-use policy is culturally important, “that change of the nuclear policy will tarnish its image in the non-nuclear weapon states, which China has [been] so consistently proud of.”¹⁵⁷ The government in Beijing realizes the importance of this to Chinese self-perception, and it would be detrimental for them to change it. James Mulvenon, deputy director, advanced analysis at DGI’s Center for Intelligence Research and Analysis, and David Finkelstein, deputy director of “Project Asia” at CNA Corporation’s Center for Strategic Studies advance Maj. Gen Pan’s position:

The importance of China’s NFU pledge lies in its centrality to Chinese doctrine. Since 1964, NFU has become one of centerpieces of Chinese nuclear doctrine; for Chinese strategists, NFU is not simply a policy statement (as it was for the Soviet Union during the Cold War) but rather is considered a guiding principle (*zhidao yuanze*) of nuclear doctrine. The extent to which Western analysts see NFU as a policy statement and the Chinese think of it as a guiding principle serves as a source of confusion and friction in understanding the current composition and future evolution of Chinese nuclear doctrine.¹⁵⁸

If the no-first-use is a guiding principle and not a policy statement, change seems even more unlikely. However, guiding principles can change; they just may change privately at the highest level. If a change occurs there should be subtle, but still observable, changes in doctrine, force planning and training. Bates Gill, Mulvenon, and Mark Stokes explain this idea in terms of the nature of the no-first-use policy, its implications of limiting arsenal, difficulty in determining policy evolutions, and the opportunity for policy changes inherent in new weapons system:

¹⁵⁷ Pan Zhenqiang, “On China’s No First Use of Nuclear Weapons.” Pugwash Meeting: London, United Kingdom, no. 279, 15-17 November 2002, <http://www.pugwash.org/reports/nw/zhenqiang.htm> (accessed 20 April 2009).

¹⁵⁸ Mulvenon and Finkelstein, 140.

First, [a no-first-use] pledge is highly symbolic—it is not verifiable and any violation of the pledge would not be detected until it is too late. Second, as a practical matter, we need to recognize that the NFU pledge is probably less an altruistic principle, and more a simple reflection of the traditional operational constraints imposed on Chinese doctrine by the country's qualitatively and quantitatively limited arsenal: China maintains an NFU pledge because it fits with the realities of nuclear weapons inventory. As its force structure changes, so too might its NFU principle.¹⁵⁹

In the past forty years, no force structure change has been so drastic as the incorporation of ballistic missile submarines. Historically, the 2nd Artillery has never possessed the technology or the ability to exchange nuclear blows with a superpower. The best-case scenario was a one-time, limited retaliatory strike. The no-first-use policy fits this limitation well, as it allows Beijing to utilize their nuclear forces effectively and reap the added public relations benefits. However the new capabilities inherent in the SSBN will change that basic structure.

3. Force Size Requirements

The no-first-use policy brings additional substantive benefits to Beijing. Because of its limited nature, it only requires a small force made up of relatively archaic nuclear technology. Yoshihara and Holmes explain how these benefits are related to the policy. “Such nuclear minimalism has exerted significant influence on China’s nuclear posture, suppressing the size and readiness of the force structure.”¹⁶⁰ Size and technological advancements can be evaluated by comparison. Examining the reason behind Washington’s extremely large nuclear arsenal highlights the benefits of Beijing’s policy. For the United States to employ overwhelming nuclear force against a country (or multiple countries) they must maintain a much larger weapon arsenal. A nuclear triad, with air, land, and sea delivery platforms, becomes necessary to increase the amount of

¹⁵⁹ Bates Gill, James Mulvenon, and Mark Stokes, “The Chinese Second Artillery Corps: Transition to Credible Deterrence,” in James C. Mulvenon and Andrew N.D. Yang, “The People’s Liberation Army as an Organization: Reference Volume v1.0,” Rand: National Security Research Division, 2002, http://www.rand.org/pubs/conf_proceedings/2008/CF182part1.pdf (accessed 10 June 2009), 516.

¹⁶⁰ Yoshihara and Holmes, 34.

destruction enacted upon the enemy and to engage in competition at different levels of the nuclear ladder of escalation. General Pan explains how China is different:

In accordance with the no-first-use doctrine, China didn't find it essential to develop a large nuclear arsenal in number. The idea was as long as you are able to give a devastating counter-attack against one or two U.S. big cities, the scenario was enough to make the attacker who had the intention of preemptive nuclear strike pause, and hopefully drop the plan.¹⁶¹

Ten surviving weapons, with a 50% accuracy rate, are likely to accomplish a devastating attack on an American city. Given the United States domestic reaction following September 11, 2001, any chance of a nuclear response will likely drive policy makers toward non-nuclear solutions in a crisis. The unlikelihood of nuclear war, combined with the monetary benefits of fielding hundreds of weapons vs. thousands, is very advantageous for China.

4. Strategy Flexibility

Nuclear weapons, when intended for first use, are designed to be smart, stealthy, and advanced: surprise is the key to their success. However, overly complex weapons do not work well with a no-first-use policy. The weapons this policy requires are intended for harsh, post-nuclear attack conditions. They need to be useable, hardened, and simplistic. Complex systems have a high chance of failure and are simply “overkill.” General Pan explains:

China didn't find it essential either to seek the qualitative improvement of its nuclear force such as acquiring the capability of striking at the military targets, with much greater precision guidance, or fitting more nuclear warheads on a single missile (MIRVed).¹⁶²

The no-first-use policy requires no strategic flexibility. It simply requires one response--reply to an aggressive nuclear attack with nuclear weapons against a local (city) with a large population. First use weapons are designed with a distinct purpose, often to knock out enemy nuclear launch capabilities. To ensure a high rate of success, these weapons

¹⁶¹ Pan.

¹⁶² Ibid.

are designed to employ precision strike, multiple warheads, and dummy warheads. Large coordinated attacks are required to limit any response. On the contrary, no-first-use weapons only need to defeat any “missile defense” employed by a country. Targeting can be general and technology can be minimal. A complex undersea platform, likely (although possibly not at this time) to employ multiple warheads is not necessary to meet this goal.

B. RECENT POLICY CHALLENGES

The world has changed around China’s no-first-use policy. This policy was technologically sound into the late 1990s. However, the advent of two weapons advancements in particular - precision weapons and missile defense - make this policy outdated and unable to provide for adequate Chinese protection. From a political point of view, the no-first-use policy is a source of pride and positive press for the Communist Party. General Pan explains the problem from a different angle, “For one thing, from an operational point of view, China’s no-first-use pledge seems to have greatly bound its hands to maintain flexibility in seeking the optimum options.”¹⁶³ As it stands now, no options are available to Beijing until it is able to engage and overcome 1) precision weapons and 2) missile defense.

Precision weapons may one day make nuclear weapons obsolete. The ability to launch a precision weapon against a *moving* target may provide enough deterrence to make the collateral damage inherent to nuclear weapons outweigh the benefits. David Shambaugh, Professor of Political Science and International Affairs Director, China Policy Program, Elliott School of International Affairs, explains how precision weapons are changing the way Beijing is preparing for future conflict:

The opening days of the Gulf War convinced PLA analysts that they were witnessing a revolution in military affairs...the allied naval armada sat comfortably offshore in the Persian Gulf, well outside the range of Iraqi

¹⁶³ Pan.

defenses, launching wave after wave of air strikes and cruise missile attacks. The surgical bombing substantially degraded Iraqi air defenses.¹⁶⁴

Precision weapon attacks against China's nuclear forces have to be a cause of great concern for Beijing. Currently, mobile nuclear missiles may still have an advantage over precision strikes, maintaining the ability for a quick launch after a short setup. However, as the technology behind western precision missile continues to evolve and the efficiency in missile employment rises, mobile missiles will become more vulnerable.¹⁶⁵ Some analysts, including Shen Dingli, deputy director and professor, Center of American Studies at Fudan University in Shanghai, question the validity of the no-first-use deterrence policy when faced with precision weapons.

If China's conventional forces are devastated, and if Taiwan takes the opportunity to declare *de jure* independence, it is inconceivable that China would allow its nuclear weapons to be destroyed by a precision attack with conventional munitions, rather than use them as true means of deterrence.¹⁶⁶

Regardless of Beijing's actual response when they are nearly defeated or faced with a step toward Taiwan independence, China must consider the effect precision weapons will have on their ability to launch nuclear counterattacks. This launch ability is a step progress that can be attacked at separate critical junctions. Precision weapons are able to target nuclear weapon systems, communications grids, as well as decision makers. These weapons may make even a well-hidden SSBN useless, leaving them without launch command and control. Regardless, as it now stands, if conventional precision attacks are made against China's nuclear weapons and their control, China, *cannot* respond with nuclear weapons and remain true to a literal reading of the no-first-use policy.

¹⁶⁴ David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2004), 1.

¹⁶⁵ It is important to note that the Chinese have very limited experience launching nuclear weapons. On the contrary, in the last decade the United States has made great use of precision weapons in the Persian Gulf, making their operators and tactics battle tested, greatly increasing their effectiveness and efficiency.

¹⁶⁶ Shen Dingli, "Nuclear Deterrence in the 21st Century," *China Security*, no. 1 (Autumn 2005), 13. Quoted in Yoshihara and Holmes, 35.

Missile defense is another recent western advancement that threatens the no-first-use policy credibility. While precision weapons threaten nuclear weapons prior to their launch, missile defense attacks nuclear weapons after launch. Although they loudly oppose it, Beijing has no tactical answers for missile defense.¹⁶⁷ As discussed in Chapters I and II, missile defense systems are driving China to acquire the Type 094. General Pan explains this phenomenon in larger terms:

Given the deployment of missile defense systems, China should perhaps realize that the present minimum nuclear arsenal is inadequate to meeting the new challenges, and therefore should greatly expand its nuclear force to the extent that it can be actually used in different scenarios.¹⁶⁸

Beijing can meet the challenges posed by missile defense system in two ways. They can expand their nuclear forces (the development of the Type 094 fits this argument), and they can change their no-first-use policy to better utilize their existing nuclear forces. With a missile defense force in use, if China has any nuclear weapons in operation after initial precision attacks, the response force will likely be destroyed.¹⁶⁹

Overall, the no-first-use policy does not match the threats posed to China's 2nd Artillery. China's nuclear forces lack the ability to overcome precision weapons or missile defense. Upgrading to an undersea platform may revive the no-first-use policies credibility; however, this argument is limited. Precision weapons, targeting the Chinese communication infrastructure, may prevent the Type 094 from receiving launch commands, negating its deterrence.¹⁷⁰ This has led many to believe that China may update their no-first-use policy. According to Mulvenon and Finklestein, "Following the release of the 2000 National Defense White Paper, some Chinese privately indicated that during the drafting process there were internal discussions about whether to

¹⁶⁷ There limited discussion of MIRV and dummy technology in U.S. and Chinese press. However these tactics are meant to overwhelm missile defense structures, not defeat them. It is unclear how effective China would be against multiple missile defense batteries.

¹⁶⁸ Pan.

¹⁶⁹ Except for the Type 094, which may be able to launch weapons close to their targets, limiting the time available for missile defense systems to engage. Chapter 2 examines ability in terms of the survivability of the Type 094 in an operating environment dominated by western submarines.

¹⁷⁰ If the Chinese decide to launch a nuclear attack as the result of communication failure, it will violate the No-First-Use policy.

conditionalize China's NFU commitment.”¹⁷¹ A published change to the no-first-use is not likely to occur anytime in the near future. However, behind closed doors, there must be a heated discussion occurring on how China can change their policies to match current technology.

C. INCORPORATION OF SSBNS AND LAUNCH POLICY

The Type 094 is a flexible platform able to adjust (if desired) to a change in the no-first-use policy. This flexibility comes from a ballistic missile submarine's inherent nature, which combines stealth and mobility, negates many of the benefits associated with precision weapons and missile defense. When incorporated, the Type 094 will allow Beijing to back up the no-first-use policy with modern technology, making it a viable policy for the foreseeable future. The incorporation of ballistic missile submarine patrols and the no-first-use policy comes with challenges that China must overcome. These issues were never actually addressed with the Type 092, as it never deployed on a deterrent patrol, although it was likely planned for and discussed. Ultimately, Beijing must change traditional attitudes before incorporating SSBNs into the no-first-use policy. First, China must reverse (although likely without explanation) its long-standing opposition to countries deploying ballistic missile submarines beyond their borders. Second, China must make critical control issue decisions, specifically how will nuclear weapon coordination occur in a hostile, open, at sea environment in the midst of nuclear war.

Beijing has a history of opposition to countries deploying ballistic missile submarines. This opposition can be found in Chinese government statements starting in the early 1960s.

U.S. submarines carrying Polaris missiles with nuclear warheads are prowling the Taiwan Straits, the Bac Bo Gulf (Tonkin Gulf), the Mediterranean Sea, the Pacific Ocean, the Indian Ocean, and the Atlantic

¹⁷¹ Mulvenon and Finkelstein, 141.

Ocean, everywhere threatening peace-loving countries and all the peoples who are fighting against imperialism, colonialism, and neo-colonialism.¹⁷²

It is understandable that in the early 1960s militarily weak China felt threatened by United States power projection capability. Beijing publicly opposed ballistic missile submarines, not only for their own protection, but also for the region as well. “In stationing nuclear submarines in Japan, the United States is posing a direct threat to the Japanese people, the Chinese people, and the peoples of all other Asian countries.”¹⁷³ Technology and capability have certainly *reversed* these feelings. How is the deployment of a Type 094 less threatening than the Polaris submarines of the 1960s?

One argument China may pose to prove the non-threatening nature of their ballistic missile forces is that they do not intend to deploy the Type 094 beyond their territorial waters. The United States, due to the limited range of the Polaris ballistic missile, was forced to operate close to Soviet Union in order to provide adequate deterrence. Beijing may argue that they intend to operate the Type 094 in bastions within their territorial waters. This argument is in line with Beijing’s stance that they “never [deploy] any nuclear weapons beyond [their] borders.”¹⁷⁴ However, as discussed in Chapter III, this type of deployment falls short of China’s deterrence needs. In the 1960s Washington would have certainly preferred to keep the Polaris missile submarines close to the continental United States, but they could not. In order to be viable, the submarine with a missile of limited range had to be close to its target. The same is true for the Type 094. In order to be a viable deterrent, able to threaten the continental United States, it will have to deploy outside of China’s territorial waters. These extended deployments, necessary until Beijing improves the range of their ballistic missiles, would be at odds with the CPC’s published policy:

¹⁷² “Statement of the Government of the People’s Republic of China.” 16 October 1964.

¹⁷³ “Statement of the Government of the People’s Republic of China.” 16 October 1964.

¹⁷⁴ Beijing continued this argument in 2002, claiming, “China has...never deployed nuclear weapons abroad.” This is essentially the same argument. *Government White Paper: China's National Defense in 2000*; *White Paper: China's National Defense in 2002*. (People’s Republic of China, Information Office of the State Council in Chapter II: National Defense Policy, December 2002.)

All nuclear weapon states which have deployed nuclear weapons outside their borders withdraw all these weapons home ... China has not deployed and will not deploy any nuclear weapons outside its border. China considers this to be a matter of principle.¹⁷⁵

China's "principles" will have to be adjusted to match their capabilities and deterrence needs. It is likely that this will occur without statement from Beijing. This is an easy change; certainly one Beijing is ready to make.

The second change is not so easy. In order to ensure retaliatory launches from the Type 094, Beijing must adjust the 2nd artillery's launch control norms. Shambaugh discusses launch control norms and uncertainties as they relate to land-based weapons.

It is not certain exactly how the communication to launch missiles is conveyed via the [General Staff Department] GSD, but it is believed that there are also separate and secure communication lines from the [Central Military Commission] CMC to Second Artillery Headquarters and thence to all launch brigades. It is also understood that a launch brigade must receive separate communications from the CMC and GSD before a launch is authorized.¹⁷⁶

Maintaining multiple lines of communication, in an at sea environment, is difficult in calm seas and nearly impossible in poor weather situations. If both the CMC and GSD are required to issue separate transmissions, there is a possibility that both orders will not be received. Because of this, Beijing has two options to ensure weapons release in a crisis: either improve their submarine communication ability to a level of redundancy offering near perfect communications, or delegate nuclear release to the unit level.

The Royal Navy, relying solely on SSBNs for nuclear deterrence, places great emphasis on submarine communications. "Ballistic missile submarines must at all times have a robust and reliable link with their chain of command on the mainland...in order to authorize the use of nuclear weapons and keep them under firm political control."¹⁷⁷ Beijing has a number of options available for communicating with their submarines, as

¹⁷⁵ Jiadong.

¹⁷⁶ Shambaugh, 167.

¹⁷⁷ "Ballistic Submarines (SSBN)," United Kingdom, Royal Navy Website, <http://www.royalnavy.mod.uk/server/show/nav.2420> (accessed 31 January 2009).

shown in Figure 8. Given the ASW environment in which the Type 094 will operate, surfacing or even operating at periscope depth may be too risky. ELF (extremely low frequencies) and VLF (very low frequencies) communications are the safest options available to Beijing. However, both options have their own inherent challenges that PLAN forces must overcome.


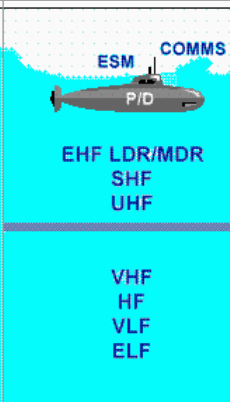
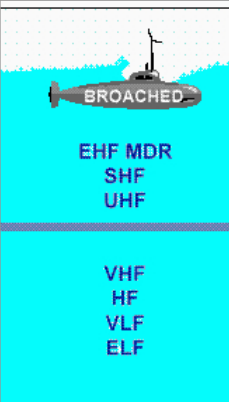

CORE		LOW RISK	OVERT
STEALTH	COVERT		
			
	EHF LDR/MDR SHF UHF	EHF MDR SHF UHF	EHF MDR SHF UHF
	VHF HF VLF ELF	VHF HF VLF ELF	VHF HF VLF ELF

Figure 8. Submarine Communication Options¹⁷⁸ Source: GlobalSecurity.org

Very Low Frequency communications have a long history of use for Chinese submarines. According to John Lewis and Xue Litai, Mao himself took interest in the construction of some high power stations.¹⁷⁹ VLF communications are robust, requiring tall (500ft+) towers for transmission. This communication method has two insurmountable problems. As seen in Figure 9, the towers are extremely large, making them vulnerable to attack from precision weapons. And more importantly, VLF communications are not secure and can be intercepted. Stephen Polk, in a report for the

¹⁷⁸ "Military: Submarine Communications," GlobalSecurity © 5 September 2008; JPG, <http://www.globalsecurity.org/military/systems/ship/sub-comm.htm> (accessed 30 April 2009).

¹⁷⁹ Lewis and Xue, 118.

journal *Air Power*, argues that Beijing is, “apparently anxious about the ability of advanced navies to home in on long transmission bursts.”¹⁸⁰ These two issues with VLF communications may make their effectiveness in a crisis questionable.



Figure 9. VLF Towers at Greenbury Point in Annapolis, MD¹⁸¹

Switching to Extremely low frequency communications mitigates the problems that plague VLF communications. As seen in figure 10, ELF transmission does not require large towers, and submarines can stay hidden and deeply submerged, and retain conductivity. ELF transmissions have an extreme range and travel easily through air,

¹⁸⁰ Stephen Polk, “China’s Nuclear Command and Control,” *Air Power*, vol. 2, no. 4, Winter 2005, <http://www.aerospaceindia.org/Journals/Winter%202005/China's%20Nuclear%20Command%20and%20Control.pdf> (accessed 10 June 2009), 172.

¹⁸¹ Mr. T in DC, “Old U.S. Radio Towers,” flickr © 3 September 2007; JPG, http://images.google.com/imgres?imgurl=http://farm2.static.flickr.com/1185/1317352346_f642bcd67.jpg%3Fv%3D0&imgrefurl=http://www.flickr.com/photos/mr_t_in_dc/1317352346/in/set-72157600273766479/&usg=__mTVdNa_Cinego30WQDyWfcR7P0w=&h=334&w=500&sz=90&chl=en&start=16&um=1&tbnid=iaPzSmmWSfFbnM:&tbnh=87&tbnw=130&prev=/images%3Fq%3Dgreenbury%20towers%26hl%3Den%26safe%3Doff%26client%3Dsafari%26rls%3Den-us%26sa%3DN%26um%3D1 (accessed 30 April 2009).

water, or *land*. They will be the preferred method of transmitting data and launch commands to the Type 094 when at sea. Polk explains this advantage, but questions China's ability to utilize these systems.

Extremely low frequency (ELF) communications have the advantage that messages can be received at depths of two to three hundred metres, maximising submarine stealth and survivability. There are major problems with ELF in practice, however, and it is not clear that China has mastered that technology.¹⁸²

Polk made this claim in late 2005, and it is likely that Beijing has been increasing their ELF capabilities. Even with this increase, it will still be difficult for China to maintain constant two-way communications with ELF or VLF in high sea states. A submarine may be able to retrieve information, but not send back acknowledgement. Given this, will the leadership in Beijing be willing to delegate a level of control to submarine commanders and political officers?

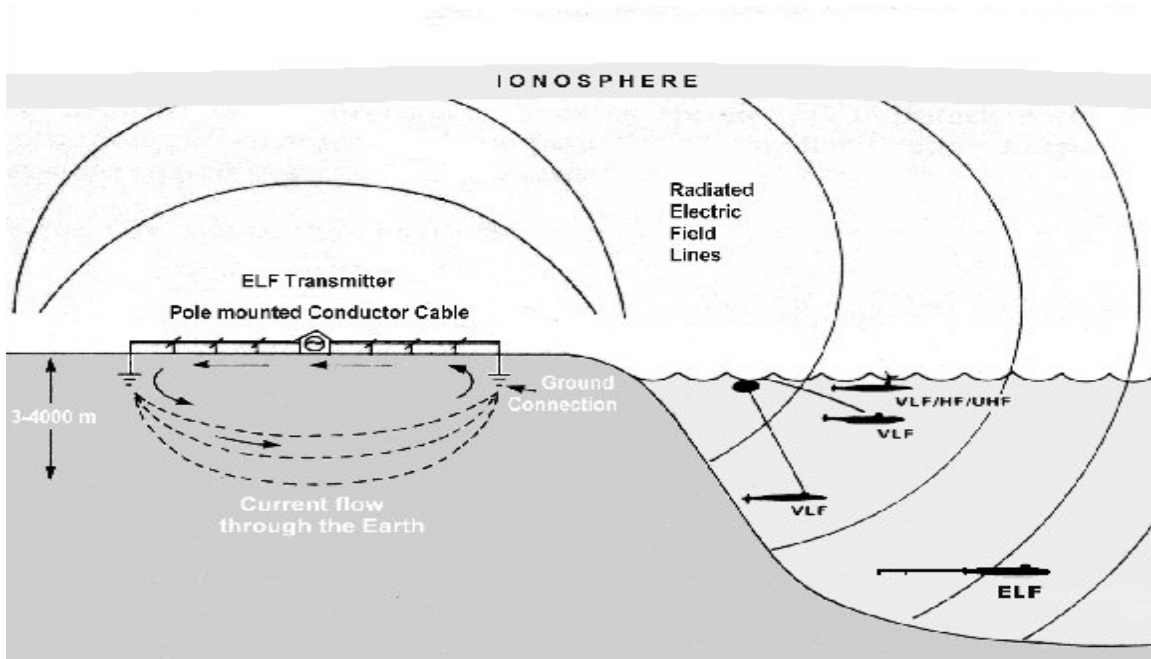


Figure 10. ELF Communications¹⁸³ Source: www.vlf.it

¹⁸² Polk, 173.

¹⁸³ "Exploring ULF-ELF and VLF Radio Band: Reception of Submarine Communications System," 1K1QFK, Renato Romero, <http://www.vlf.it/submarine/sbmarine.html> (accessed 30 April 2009).

No foreseeable submarine communication method will ever be 100% reliable. Because of this, most countries deploying submarines allow the onboard leadership decision-making ability, trusting their judgment and training. There are conflicting opinions about whether Beijing is willing to do this. According to James Mulvenon and David Finkelstein's interpretation of the *Zhanyixue*, the science of campaigns, launch authority does not have to *always* rest with Beijing.

The retaliatory strike is “usually” (*tongchang*; 通常) carried out under the direction of the supreme command, perhaps suggesting that the authority to launch a retaliatory strike could be delegated to lower levels under certain unspecified circumstances.¹⁸⁴

There may be a limited amount of authority Beijing is willing to grant to lower levels. It is difficult to speculate how the relationship between the CMC, GMC, Commanding Officer, and Political Officer will play out. Yoshihara and Holmes explain that 100% launch control may be out of their hands:

Foremost in the thinking of any political leadership is command and control of the nation's nuclear arsenal. It is unclear whether Beijing would be willing to delegate operational control of a nuclear-armed submarine to a tactical commander. Like Moscow during the Cold War, Beijing may want to assert closer supervision. Practical considerations such as technical feasibility and steep financial costs, moreover, could impose burdens that China may be unwilling to carry.¹⁸⁵

A technical and political balance for control will have to be hashed out between Beijing and the PLAN. The key to this relationship will be situational awareness. To be successful, Beijing *must* keep their submarines current on world and regional events that affect leadership decision making. If the submarine has limited knowledge of the outside world, the crew may doubt, or at the very least, be surprised and fumble through launch procedures in an environment where time may not be on Beijing's side. If a country, such as the United States, launches nuclear weapons against China, it is unthinkable to believe that they will not send their SSNs on hunt and kill missions, bringing the

¹⁸⁴ Wang Wenrong, 355. Quoted in Mulvenon and Finkelstein, 137-138.

¹⁸⁵ Yoshihara and Holmes, 35.

survivability of the Type 094 into question. Beijing may be willing to wait a number of days before launching a retaliatory strike ... but they may lack a weapon system at that point.¹⁸⁶

China's incorporation of the Type 094 at peace, within the limitations of no-first-use policy, will be vital to understanding how Beijing will control their SSBNs in war. It will be easy for China to reverse their opposition to countries deploying SSBNs, a political argument based more on capabilities than convictions. Communication efficiency, in a hostile environment, will dictate how much control Beijing must give to the submarine. This flow of information will be the difference between an effective deterrent and a vulnerable unreliable weapon.

D. SUBMARINE CASUALTIES

The flow of information on a submarine is vital for deterrence operations. However, situational reports and launch orders only make up a portion of the essential information. The reverse flow of information, from the submarine to Beijing, will limit the risk of escalation following problems or mishaps. A constant "reverse" flow of information, good or bad, alerts Beijing that ultimately the patrolling Type 094 is not lost. This is vitally important, because while at sea the Type 094 will face casualties. The recent collision involving French and British SSBNs is a good illustration of this. Even highly trained navies, with years of SSBN operating experience, suffer at-sea mishaps.¹⁸⁷ In the event of a serious casualty, it is likely that at some point Beijing will lose contact with the submarine. How the CCP reacts to the unknown will be shaped by the no-first-use policy. Under the no-first-use policy, the CCP cannot retaliate (nuclear) after the loss of an SSBN, even if it believes that loss was due to enemy attack.¹⁸⁸

¹⁸⁶ Philip C. Saunders and Jing Dong Yuan, "China's Strategic Force Modernization" in P.J. Bolt and A.S. Willner, *China's Nuclear Future*, (Boulder: Lynne Rienner Publishers: 2005), 91.

¹⁸⁷ The February 2009 collision, of British and French SSBNs, is a good example of this.

¹⁸⁸ This scenario assumes that the ASW attack on the Chinese SSBN occurs prior to nuclear war.

For the sake of simplification, submarine crises at sea can be broken up into two categories; equipment failures and personnel mistakes *or* encounters with aggressive enemy submarines (which in turn cause equipment failures and personnel mistakes). Usually, while on patrol, the likelihood that an SSBN will encounter an opposing submarine is considerably less than attack submarines, as their mission dictates a remote deployment area. In addition, for many countries, trailing enemy SSBNs is a risky proposition; aggressive submarine hunting may trigger nuclear war if a country feels their deterrent is threatened. China's nuclear policy may cause the Type 094 to be treated differently. If western planners believe in the validity of the no-first-use policy, they will aggressively track and engage the Type 094, without fear of nuclear retaliation. This increases the likelihood of at sea encounters to a level similar or above that of an attack submarine. This is a risky proposition given the Type 094's weapons load. An accident, credited to a western submarine, could conceivably cause public outcry vastly more enraged than the one seen after the 1999 bombing of the embassy in Belgrade. According to Susan Shirk, the former Deputy Assistant Secretary of State during the Clinton Administration in the Bureau of East Asia and Pacific Affairs at the time of the bombing.

When the Belgrade bombing occurred, [the Chinese leaders] believed that it was quite likely that the students would be enraged at the Chinese government itself for being so weak as to allow in some sense the Americans to attack the embassy.¹⁸⁹

The public, enraged over perceived weakness in the face of America or other competitor, will command the Communist Party's full attention, taking it away from the crisis situation. The CCP has two options to limit a public response to the loss of an SSBN. First, they must ensure their crews are highly trained in damage control, able to safely save the ship in any matter of crisis. And second, the Communist Party cannot allow blame to be blindly placed on Washington if a crisis does occur.

¹⁸⁹ Susan L. Shirk (Interview by Joanne J. Myers) "China: Fragile Superpower: How China's Internal Politics Could Derail its Peaceful Rise," Carnegie Council: The Voice for Ethics in International Policy (transcript), April 5, 2007, <http://www.cceia.org/resources/transcripts/5425.html> (accessed 3 May 2009).

Damage control, in the face of flooding, fire, loss of control, and casualties, will mean the difference between life and death for submarines. Why can something as simple as clothes drier fires cause grave concern? Time. On land or surface, catastrophes, such as fires or rudder issues, can be dealt with in minutes. Teams have time to don equipment and air spaces as necessary to ensure safety. This is not the case for submarines; catastrophes must be dealt with immediately, in seconds instead of minutes. For example, a small fire, in the enclosed space of a submarine, could cause asphyxiation for the entire crew in a matter of minutes, causing the loss of the entire submarine (or sea-based nuclear deterrent in the case of the Type 094).

For an SSBN, casualties can be far worse. To be an effective deterrent the Type 094 must stay hidden; they will not have the luxury of surfacing when on patrol. A study of submarine casualties, conducted in 1986 still holds true for today:

Plane failures and flooding are the most critical of the casualties to be trained... emphasize the need for adjustment of recovery action to operational requirements, such as the tactical situation and concealment by noiseless submerged running for as long as possible.¹⁹⁰

Therefore, not only will the Type 094 have to deal with casualties effectively in a very short time period, they will also have to do so without surfacing or alerting enemy submarines to their location. Given these high goals, PLAN training for submarine accident control is not to the level required for reliable SSBN operations. This point of view is based the accident on the Ming class (hull number 361) attack submarine that killed all personnel on board.¹⁹¹ In articles about this tragedy, the BBC stated, “China’s navy has also reportedly experienced operating problems because of inadequate crew training.”¹⁹² If the crew died of asphyxiation, their deaths were *preventable* and caused by equipment or crew failure. A catastrophe on a Type 094 will be more severe, given

¹⁹⁰ “Study of Submarine Casualty Training,” Goodyear Aerospace Corporation, Akron, Ohio. (For NAVTRADEVCEEN 1813-1), March 1986, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=AD486430&Location=U2&doc=GetTRDoc.pdf> (accessed 2 May 2009), i.

¹⁹¹ William Foreman, “Chinese Submarine Accident Kills 70,” Naval Sea Systems Command, 2 May 2003, <http://www.dcfp.navy.mil/mc/articles/other/MingSub.htm> (accessed 3 May 2009).

¹⁹² “China sub deaths ‘must rouse Navy,’” *BBC News: Asia-Pacific*, 4 May 2003, <http://news.bbc.co.uk/2/hi/asia-pacific/2999533.stm> (accessed 3 May 2009).

the nature of their weapons and likelihood that their procedures would keep them submerged during a casualty. How Beijing responds to an accident or the loss of the Type 094, will greatly effect how the population responds to the CCP.

As discussed, because of the reaction limitation imposed by the no-first-use policy on the Type 094, it will encounter enemy attack submarines. If there is a catastrophe on board the Type 094, the Communist Party may be quick to blame American SSNs. This will cause the Communist Party to face an uneasy population, not keen on accepting American apologies for military actions. The Russian government was quick to place blame following the 2000 loss of the Kursk submarine.

Being close to panic under such pressure, the naval authorities built their main line of defense on the hypotheses of a collision with a U.S. or British submarine. Scant evidence was presented to support this hypothesis, but retired admirals (Eduard Baltin and Valery Aleksin were the most outspoken) immediately added all sorts of expert analysis.¹⁹³

Even if an accident is clearly caused by an American submarine, the CCP must be careful in their response. The no-first-use policy dictates that Beijing cannot react with nuclear weapons; however, the people will demand retribution for the loss of their submarine. If Beijing reacts with hypothesis or misinformation, they risk revolution if they do not threaten the United States with retaliation. Ultimately, the no-first-use policy *increases* the risk for an at-sea SSBN. With no “nuclear policy response protection,” promising nuclear war if an SSBN is attacked, the Type 094 will operate in a hostile environment. This environment might have never existed if the attacking submarine felt that their actions might cause nuclear war.

E. CONCLUSION

Overall, China’s adherence to the no-first-use policy will sharply limit the tactical options and increase the risk to the Type 094. Over time, the no-first-use policy has been greatly affected by circumstances inside and outside China. Born out of equipment

¹⁹³ Pavel Baev, “The Russian Navy after Kursk: Still Proud but with Poor Navigation,” PONARS Policy Conference: Washington DC, January 2005, http://www.csis.org/media/csis/pubs/pm_0215.pdf (accessed 2 May 2009), 3.

limitations in the 1960s, China soon realized the diplomatic and economic advantages of employing a small defensive nuclear force. These advantages came at a high price for Beijing, as they limited China's nuclear acquisitions to a point where they were unable to account for missile defense and precision weapons. The Type 094, when on patrol, will give the no-first-use policy the needed flexibility to provide for China's nuclear deterrent in the near future. However, the PLAN may not be ready for SSBN operations under this policy. According to a DoD assessment, 'the PLA has only a limited capacity to communicate with submarines at sea and the PLA Navy has no experience in managing an SSBN fleet that performs strategic patrols.'¹⁹⁴ In addition, the Type 094 will encounter a high level of enemy SSNs, unfettered by nuclear responsibilities. Crisis situations will arise, and Beijing must have answers. The limitations and risks of employing the no-first-use policy with SSBNs on patrol may outweigh the diplomatic benefits. This may warrant a policy change in the near future.

¹⁹⁴ O'Rourke, 33.

V. IMPLICATIONS AND POLICY RECOMMENDATIONS

When the Type 094 ballistic missile submarine makes its first patrol, many strategic factors, key to United States foreign policy, will change. These factors include: the beginning of a balance shift, between Russia and China, in the underwater nuclear weapons domain, the impact of China reaching a level of strategic parity with the U.S., specifically *guaranteed* second strike capability, and the loss of policy options, due to *invisible* nuclear escalatory ability. A discussion of these factors, while the conclusion of this thesis, is the starting point for a policy debate that must occur prior to the first Type 094 deterrent patrol.

To accomplish this discussion this chapter will be structured in the following fashion. First, a discussion of the balance of nuclear power, specifically between Russia, the United States, and China must occur. This may seem counterintuitive at first glance given the large disparity between Russian and Chinese nuclear force size, however due primarily to each state's level of SSBN readiness and repair; a declining leg of Russian nuclear triad is becoming China's strength. How will this overtaking of Russian deployed ballistic missile submarines by China affect the United States Navy? Second, a level of nuclear parity is being reached between Washington and Beijing, similar to when Russia released the Yankee class. How will this affect the United States ability to control escalation in a crisis? Implications for overall Washington procurement and specifically for the Taiwan issue must be addressed. And finally, this chapter will include a summary of the entire thesis wrapping up the discussion on the Type 094.

A. BALANCE OF NUCLEAR POWER

Without question for the foreseeable future, the United States and Russia will hold the largest stockpile of nuclear weapons. Both countries are currently retiring and mothballing legacy nuclear systems, but even with this reduction their relative sizes are nowhere near their closest competitors. One competitor, China, is an important example. While China has spent an incredible amount increasing the number and quality of their

nuclear weapons, it will remain far behind both the U.S. and Russia in terms of arsenal size. Dr. Subhash Kapila, a consultant for *Strategic Affairs* with the South Asia Analysis Group, explains how Russia's arsenal relates to China:

Russia's existing strategic nuclear weapons arsenal outnumbered the United States whereas China's nuclear arsenal at about 400 warheads is a remote comparison ... Russia's existing power projection capabilities extend far beyond its immediate neighbourhood, in all dimensions – land, sea and air. China's power projection is limited to her periphery and limited to ground forces dimensions only.¹⁹⁵

This style of analysis highlights the problem of looking at nuclear weapons simply in terms of numbers. However, there are two other issues that must be addressed. First, Russia may have a large number of weapons, but their readiness, at this time, is very poor. It is unlikely they could successfully launch the majority of their nuclear weapons in short order. Secondly, there is a point where numbers no longer matter; the argument that a country can “destroy the world X number of times over,” holds little importance during strategic planning. Once China has the ability to threaten the *majority* of U.S. or Russian cities, with survivable weapons, they will have equaled the “tangible” destructive power of the other superpowers.¹⁹⁶ With this trend in mind, Pacific Forum CSIS believes there is need for new research:

There is increasingly a need to link – both conceptually and structurally – the trajectories of the U.S.-Russian nuclear build-down and of China's nuclear modernization. Over time, the trajectories will move closer together. This requires exploration of the consequences of this convergence.¹⁹⁷

¹⁹⁵ Subhash Kapila, “Global Power Balance 2020: Perspectives,” South Asia Analysis Group, no. 2914, 4 November 2008, <http://www.southasiaanalysis.org/%5Cpapers30%5Cpaper2914.html> (accessed 4 May 2009).

¹⁹⁶ This argument is in terms of destructive power alone, and ignores the potential importance of escalation control, ladders, etc. There is cause for concern with increased levels of Chinese nuclear weapons and platforms. In the Cold War dialog (official and unofficial) channels were developed and maintained to limited the chance for nuclear engagement. The channels, between China and the United States must become more robust as new platforms are brought online.

¹⁹⁷ Robert A. Manning, Ronald Montaperto, and Brad Roberts, “China, Nuclear Weapons, and Arms Control,” *PacNet Number 20*, Pacific Forum CSIS, 19 May 2000, <http://www.csis.org/media/csis/pubs/pac0020.pdf> (accessed 4 May 2009).

To highlight this fact in terms of the Type 094 SSBN, the tangible destructive overtaking will occur when Russia can no longer threaten the United States with an underwater-deployed weapon, with the same consistency as China. Consistency, the promise of nuclear deterrence, is the key to this argument, and it is where the Type 094 fits in. The quality and quantity of Russian SSBN deployments have decreased in recent years. From 1983 to 2006 the number of deployed submarine launched ballistic missiles (SLBMs) decreased from over 100 to less than 10 (Figure 11). If this trend continues, with only two or three deployed submarines, China will be on par with Russian SLBM numbers at sea in the medium term.¹⁹⁸

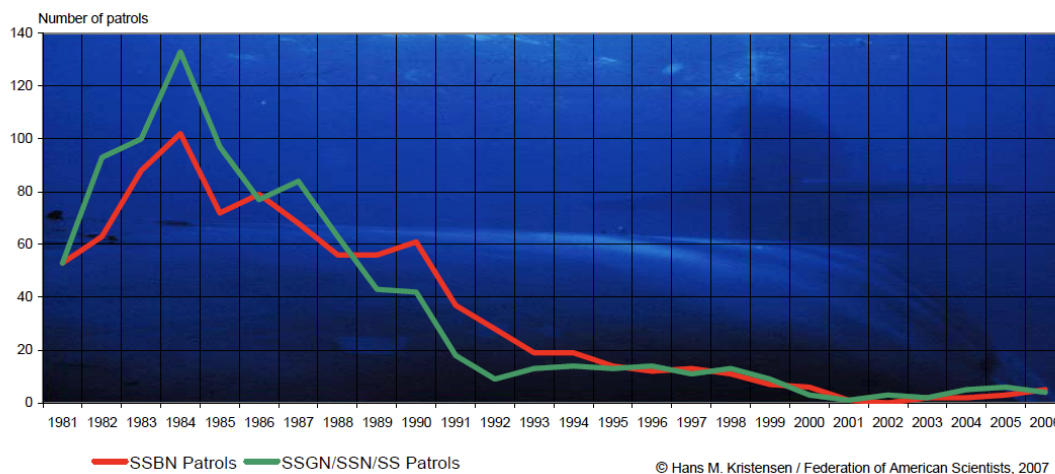


Figure 11. Russian Submarine Patrols 1981-2006¹⁹⁹ Source: www.nukestrat.com

There are strategic consequences for Beijing that result from their relative increase in nuclear standing verses Moscow. Upon first look, many of these future consequences are negative, and will be the direct result of United States naval force redeployment. For example, there is currently a 53% - 47 % U.S. SSN force split between the Pacifica and Atlantic Oceans. It is likely that this number will change as

¹⁹⁸ This number pales in comparison to the amount of SLBMs the United States Navy maintains at sea.

¹⁹⁹ Hans M. Kristensen, "Russian Submarine Patrols 1981-2006," Federation of American Scientists, © April 2007; PDF, <http://www.nukestrat.com/russia/patrol.pdf> (accessed 7 May 2009).

new strategic threat forces are deployed.²⁰⁰ This force redistribution, to include ASW assets, will place an increased amount of pressure on the PLAN navy, making deployments more costly and potentially dangerous. In addition, United States Navy force redistribution will be a “hot” topic in Washington decision-making circles. This will likely highlight the need for an increase in ASW spending and result in a larger, more proficient western ASW force. In the case of the Type 094, the negative consequences of deployment will bring about strategic benefits for China.

The redistribution of U.S. Navy ASW forces toward China as a result of the Type 094 will result in improved Chinese SSN and SSBN crews. Competition, and the underwater “cat and mouse” games it encourages, greatly enhances crew training and proficiency. China’s deterrence ability will greatly benefit from their increase in submarine activity throughout the region and the United States failure to address stagnant ASW capabilities. It is a widely accepted fact that American ASW has degraded as a result of decreased Russian activity following the end of the Cold War. The reason for this is simple: ASW capabilities can only be perfected against competing *unpredictable* submarines. How quickly can U.S. ASW recover to stem the advancements from Beijing? For the first time Chinese submarines (including the Type 094) will be operating in an environment with direct competition, honing their skills against the most proficient submarine force in the world. Although they will likely experience “growing pains,” this will lead to a generation of Chinese submarine crews extremely proficient at their craft. This experience will be especially valuable for the “boomer” sailors, as they learn to hide their boats with silent precision.

These two benefits, the relative increase in the strategic importance of the PLAN in Asia and the experience and competence of the Type 094 crews, is something Washington must account for. This accounting must also include an offset of

²⁰⁰ There are 31 SSNs and 8 SSBNs in the Pacific Command compared to 27 SSNs and 8 SSBNs in the Pacific. “COMSUBPAC Submarines,” United States Navy, Commander: Submarine Force U.S. Pacific Fleet, http://www.csp.navy.mil/content/comsubpac_subsquadrons.shtml (accessed 8 June 2009); “Atlantic Submarine Force Organization,” United States Navy, Commander: Submarine Force, <http://www.sublant.navy.mil/SubsSquadrons.htm> (accessed 8 June 2009).

Washington's losses in strategic options. United States planners have not encountered a loss of this magnitude since the deployment of the first Yankee class SSBN by the Soviet Union in the 1960s.

B. ESCALATION CONTROL OPTIONS

In 1969, significant changes were made in terms of Soviet SSBN capability. The introduction of the Yankee class submarine, the first Soviet SSBN with "firepower comparable to that of their U.S. counterparts,"²⁰¹ greatly affected Washington planning. The successful deployment of the Type 094 will likely have a similar effect. The most crucial impact on the United States in the late 1960s was the decreased decision time available to the President and top military officials. A secondary issue was the removal of a "disarming first strike" option against Soviet nuclear forces. Both of these effects can be examined in terms of the Type 094's impact.

The incorporation of the Yankee class SSBN into the Soviet Navy in the late 1960s took crisis control out of the President's hands. Henry Kissinger, President Nixon's National Security Advisor, wrote that with the Yankee class (located in patrols adjacent to the American east and west coast), "SLBM warning time would be 3-15 minutes. Thus, because it takes minutes to report a possible attack to the President and get nuclear release authority, such authority for defensive missiles [i.e., retaliatory strikes] might have to be predelegated." ²⁰² It is important to note that in the original message, the President himself underlined *predelegated*, highlighting its importance. Nixon also wrote a handwritten response (Figure 12) on the front of Kissinger's message.

1. They have closed the gap –
2. They continue to increase –
3. They want to talk –

²⁰¹ "Evolution of Subs: U.S. and Soviet Submarine Milestones of the Cold War," *National Geographic Online*, http://www.nationalgeographic.co.uk/k19/sub_detail_sov4.html (accessed 7 May 2009).

²⁰² Henry Kissinger, "Letter to Richard Nixon: Issues Concerning ABM Deployment," Declassified on E012958 Authority 7/7/98, National Archives, Nixon Presidential Materials Project, National Security Council Files, box 843, ABM Memoranda, 5 March 1969, <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB36/18-01.htm> (accessed 7 May 2009).

4. We must see that
the gap is not widened on
other side –

① They have closed the gap –
② They continue to increase –
③ They want to talk –
④ We must see that
the gap is not widened on
other side

Figure 12. President Nixon's Handwritten Response to SLBM²⁰³

Dr. William Burr, Senior Analyst, director of the National Archive's nuclear history documentation project explains this note's importance, "Noting that "they" (the Soviet Union) had "closed the gap," that is, reached strategic parity."²⁰⁴ This "strategic parity," the result of Soviet SSBN developments, was cause for great concern and is relevant in a discussion of China's nuclear forces today. Without question China is *starting* to reach a level of strategic parity, certainly in terms of destructive retaliatory power, with the introduction of the Type 094. The absolute ability to "retaliate" in kind alters American policy toward China. If China launches a nuclear weapon, there remains a significant frightening thought that the President might *give up* release authority to a lower level commander. Nixon and Kissinger's answer to the SLBM was an increased push for anti-ballistic missile (ABM) forces.

Another significant issue faced by President Nixon was the new inability to destroy all of the Soviet's weapons with a preemptive strike. Kamphausen and Scobell, from the United States Army War College explain:

²⁰³ Richard Nixon, "Handwritten Response to Henry Kissinger's Letter: Issues Concerning ABM Deployment," Declassified on E012958 Authority 7/7/98, National Archives, Nixon Presidential Materials Project, National Security Council Files, box 843, ABM Memoranda, 5 March 1969, <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB36/18-01.htm> (accessed 7 May 2009).

²⁰⁴ William Burr, "Missile Defense Thirty Years Ago: Déjà vu All Over Again?" The National Security Archive Online, 18 December 2000, <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB36/> (accessed 7 May 2009).

[The] deployment of its first Yankee-class SSBN in the late 1960s convinced President Nixon that the United States no longer possessed a viable damage limitation option against Soviet nuclear forces. A disarming first strike was no longer conceivable. This accelerated a shift in U.S. thinking towards escalation control options in the U.S.-Soviet nuclear competition.²⁰⁵

Considering the likelihood of invulnerability discussed in Chapter 2, this issue will be a concern. How must the United States alter their policy, assured of China's second strike capability? Kamphausen and Scobell argue that the launching of the Type 094 "will affect U.S. calculations and limit U.S. options during a crisis."²⁰⁶

Introduction of the Type 094 will force the United States to reconsider some current policies toward China. Beijing recognizes the significance of the Type 094, and how its deployment will force the United States to look differently at China's nuclear capability. A patrolling Type 094 will also effect Washington decision-making if there is another crisis over Taiwan *or* if the United States interferes with a conflict in which Beijing is involved (for example a dispute over territory). Overall, United States policy will have to be adjusted to account for any level of "strategic parity" with Beijing. A review of current policy documents is necessary to explore where adjustments can be made.

C. CURRENT U.S. POLICY

To understand how the United States and its allies will jointly face the emerging Chinese SSBN threat, a review of United States security policy interests, with respect to Beijing, is necessary. In spite of Beijing's protests, the United States, in published security documents, specifically expresses concerns over China's military buildup—including the push for SSBNs. An examination of key United States policy documents, the National Security Strategy (NSS), the National Defense Strategy (NDP), the National Military Strategy (NMS), and Maritime Strategy, will give the best indication of how Washington intends to interact with Beijing.

²⁰⁵ Kamphausen and Scobell.

²⁰⁶ Ibid.

This review begins with the National Security Strategy released by the White House in March 2006. The NSS broadly challenges Chinese leadership to change in order to continue their success.²⁰⁷ An element of this “change” is increased military *transparency*. At this time, China keeps much of their military surrounded in mystery.²⁰⁸ While China may in fact increase overall military transparency in the coming years, they will not likely increase transparency of their ballistic missile submarine program. It should be noted, however, that no country, including the United States, is forthcoming about their submarine capabilities and intended missions. Therefore, since broad “submarine” transparency is unlikely, China should directly address specific areas, such as communications, command and control issues. These questions can be answered with terms such as “robust” or “redundant,” easing some of the uncertainty surrounding China’s new ballistic missile capability. However, U.S. strategy does not end here; more focused analysis and Chinese threat perceptions are found in the National Defense Strategy.

The National Defense Strategy (NDP), published by the office of the Secretary of Defense, was released in June 2008. The NDP’s primary focus is on the challenges faced by the United States in the war on terror. However, it does identify the threat of “rising military power of other states.”²⁰⁹ China’s primary military power growth, approaching parity with the United States and Russia, is in submarine advancements. Submarines are further addressed in this report as “niche areas of military capability and competition in which [China] believe[s] they can develop a strategic or operational advantage.”²¹⁰ The NDP acknowledges China’s “competing potential,” and the impact their strategic choices

²⁰⁷ *The National Security Strategy of the United States of America*, United States of America, The White House, March 2006, <http://www.whitehouse.gov/nsc/nss/2006/nss2006.pdf> (accessed 12 September 2008), 40.

²⁰⁸ China keeps much of their military a secret, most notably spending and procurement. One element of submarine transparency that the United States should push for is in the area of control and safeguards with regards to ballistic missile submarines.

²⁰⁹ *2008 National Defense Strategy*, United States of America, The Secretary of Defense, June 2008, <http://www.defenselink.mil/news/2008%20National%20Defense%20Strategy.pdf> (accessed 12 September 2008), 2.

²¹⁰ *Ibid.*, 3.

have on international security.²¹¹ Following this logic trail, it is clear that the Type 094 will have an impact on Asian regional security—and because of this an indirect effect on the world security picture. The NDP identifies the direction the United States will take to meet these challenges.

The Department will respond to China's expanding military power, and to the uncertainties over how it might be used, through shaping and hedging. This approach tailors investment of substantial, but not infinite, resources in ways that favor key enduring U.S. strategic advantages. At the same time, we will continue to improve and refine our capabilities to respond to China if necessary.²¹²

What exactly is shaping and hedging? How will the United States invest resources to refine our capabilities to respond to a new Chinese ballistic missile submarine? But first, why is submarine technology so important in Beijing right now?

The National Military Strategy (NMS), published by the Chairman of the Joint Chiefs of Staff, answers this “why.” It identifies what the new general Chinese submarine technology threatens—specifically United States “strategic access.”²¹³ Strategic access is the concept that United States forces, specifically maritime, must have access to “key regions and lines of communications critical to [United States] security.”²¹⁴ If China is able to create “anti-access environments” with submarines, they will have effectively defeated United States naval strategy—without matching it.²¹⁵ This will be extremely important if the Chinese use the Type 094 to pursue a bastion strategy, as discussed in Chapter III. It will be very difficult for western submarines to operate and

²¹¹ 2008 *National Defense Strategy*, 3.

²¹² *Ibid.*, 10.

²¹³ *The National Military Strategy of the United States of America: A Strategy for Today; A Vision for Tomorrow 2004*, The United States of America, The Chairman of the Joint Chiefs of Staff, 2004, http://209.85.173.104/search?q=cache:3Jcb_kpsT3kJ:www.defenselink.mil/news/Mar2005/d20050318nms.pdf+national+defense+strategy+secretary+of+defense&hl=en&ct=clnk&cd=1&gl=us&client=safari (accessed 12 September 2008), 11.

²¹⁴ *Ibid.*

²¹⁵ While it is generally accepted that China is developing anti-access environments to ensure that it will become too dangerous for the United States to take action in a Taiwan conflict, these developments have direct implications for SSBNs, specifically ones operated in a Bastion strategy. If China is able to create anti-access environments around their coastline, multi-platform U.S. ASW may be effectively defeated, leaving the entire Chinese Navy free to focus on a few possible U.S. navy submarine. *Ibid.*, 5.

track the Type 094 in a hostile environment. With the potential for strategic access limitations, due to new submarine technologies identified, what should the United States' response be?

The Cooperative Strategy for 21st Century Seapower (Maritime Strategy) of the United States gives the direction from which the response should come. . First, it specifically states that the United States cannot be effective if it attempts to face the challenge of the Type 094 by themselves: "...integrated maritime operations...send a powerful message to would-be aggressors that we will act with others to ensure collective security and prosperity."²¹⁶ This publication goes on to highlight the role that "trust and cooperation" play among international partners.²¹⁷ It is in this joint role that the responsibility for "sea control" lies.²¹⁸ Sea control, which includes the ability to achieve and maintain strategic access at sea, can be denied by "the growing number of nations operating submarines, both advanced diesel-electric and nuclear propelled."²¹⁹ The Maritime Strategy then lays the framework for success. This framework must be built on "*maritime domain awareness* (MDA) and expanded *intelligence, surveillance and reconnaissance* (ISR) capability and capacity."²²⁰ Effective application of MDA and ISR in a joint environment focused on maintaining sea control to prevent anti-access environments is the first step in facing the challenges posed by the Type 094. Both of these issues are important to regional stakeholders, specifically Japan and Taiwan, with Taiwan being a special case worthy of further discussion.

1. Considerations for Future United States—Taiwan Policy

Colin Grey, a professor of international politics and strategic studies at the University of Reading, England is quoted saying, "The national territory and political

²¹⁶ *The Cooperative Strategy for 21st Century Seapower*, United States of America, The Chief of Naval Operations, October 2007, http://209.85.173.104/search?q=cache:9AK09_dTwHkJ:www.navy.mil/maritime/MaritimeStrategy.pdf+Maritime+strategy&hl=en&ct=clnk&cd=1&gl=us&client=safari (accessed 12 September 2008), 5.

²¹⁷ *Ibid.*, 8.

²¹⁸ *Ibid.*, 10.

²¹⁹ *Ibid.*

²²⁰ *Ibid.*, 13.

independence of nuclear-armed states is not to be violated or challenged, for sensible fear of the possible consequences.”²²¹ This statement, from the Chinese perspective, is especially important when discussing the impact of Type 094 program on potential conflict over Taiwan. It is a well-known fact that China considers Taiwan to be part of their territory. A more viable deterrent combined with the sea-deniability benefits of Chinese submarine developments decreases the likelihood of American military interaction at levels seen during the 1996 Straits Crisis.

The introduction of Type 094 limits the United States response alternatives in a crisis involving Taiwan. According to the Council on Foreign Relations,

The most plausible—some would say the only likely—near-term scenario that could bring China and the United States to a nuclear brink would be an attempt to change the status quo in the Taiwan Strait, either by a move toward formal Taiwanese independence or by China seeking to incorporate the island by force.²²²

Is Taiwan worth nuclear war? The introduction of the Type 094 brings a degree of certainty to the reality of possible Chinese nuclear action over Taiwan. For example, if Taiwan takes steps towards independence and China reacts by mobilizing the PLAN SSBN force the United States must consider nuclear weapons in any defensive strategic planning. The key difference, brought about by the development of the Type 094, is the general acceptance by the United States that Beijing is ready to respond with nuclear weapons if it appears they are going to lose Taiwan. Although this goes against stated Chinese nuclear doctrine, it must be considered. If China decides on a constant at-sea patrol option, the United States will not have access to any observable rise in nuclear threat level. Without the “heads up” that nuclear weapons are being moved, fueled, etc., the United States must always consider that China is one button push away from attacking U.S. forces or territories.

²²¹Colin Gray, *Modern Strategy* (Oxford: Oxford University Press, 1999), 347. Quoted in Jeremy Stocker.

²²²William J. Perry, Brent Scowcroft, and Charles D. Ferguson, “U.S. Nuclear Weapons Policy (Uncorrected Proofs),” Council on Foreign Relations, April 2009, http://www.cfr.org/content/publications/attachments/Nuclear_Weapons_TFR62.pdf (accessed 7 May 2009), 43.

The Council on Foreign Relations gives their advice on these limitations. “Given this conclusion, the United States has a clear interest in increased dialogue with China on a range of strategic issues, including U.S. ballistic missile defenses aimed against North Korea.”²²³ Admiral McVadon warned that a situation like this might occur:

What strategic dilemmas might Washington encounter as a result of China’s new nuclear submarine force? Beijing’s smug confidence that Washington must always keep in mind China’s status as a nuclear power will be reinforced if the PLAN is successful with its ongoing program to build several modern Jin-class (Project 094) nuclear-powered ballistic-missile submarines (SSBNs).²²⁴

Can Washington limit themselves to simply diplomatic actions in a crisis over Taiwan? The quick answer is no. Changes to U.S. policy must occur to meet this new, strategically limiting, advancement.

2. Overall U.S. Policy Change Recommendations

According to Perry, Scowcroft, and Ferguson, “the combination of China’s still developing strategic objectives and its ongoing modernization of its nuclear and nonnuclear forces, China ... could be involved in an immediate or potential contingency.”²²⁵ Great care must be devoted to this issue. If the Washington planners make difficult decisions now, before the Type 094 is fully operational, the strategic effects can be minimized. Two immediate changes, cooperation with Japan over the P-3 Maritime Patrol Craft replacement and an acknowledgement by the United States that Chinese military modernization is no longer completely focused on Taiwan, will eventually lead to the desired effect.

First, the United States should only support a jointly agreed upon U.S.-Japan aerial anti-submarine platform. The United States has been “seriously unresponsive” in

²²³ “U.S. Nuclear Weapons Policy (Uncorrected Proofs),” 45.

²²⁴ Eric A. McVadon, “China’s Maturing Navy,” *Naval War College Review*, vol. 59, no. 2 (Spring 2006), 93.

²²⁵ “U.S. Nuclear Weapons Policy (Uncorrected Proofs),” 11.

finding a replacement for the P-3 Orion.²²⁶ This aggravated the Japanese, who took it upon themselves to develop the P-X maritime patrol aircraft. While the Japanese developed the P-X, the United States developed the Multi-Mission Maritime Aircraft (MMA), a program based on the Joint Strike Fighter 13 nation model.²²⁷ By choosing to develop the P-X in-house, Japan has negated an immeasurable amount of technological potential. This inevitable result is coupled with certain compatibility issues already the subject of a “systems co-operation and interoperability comparative study.”²²⁸ Japan has already acknowledged that it may stop development of the P-X and support the MMA. However, given this issue, the United States must ensure that, in the future, aerial anti-submarine technology is developed jointly with Japan.

Unable to come to a suitable joint arrangement with Japan, Washington decided on the MMA as the P-3 Orion replacement. Not surprisingly, Congressional actions in this matter were indicative of the recent tone of legislature emanating from Washington. Instead of focusing outward on the encroaching nature of Chinese submarines, Congress decided to focus inward – worrying only about programs that bring money to the places they represent. Others have argued that the Sonobuoy Flight Vehicle is a “suitable” temporary replacement for the P-3 until the MMA comes online.²²⁹ Clearly this vehicle is a step in the wrong direction. The Sonobuoy Flight Vehicle or “Coyote” is designed for use in the very platform it is “suitable” to replace!²³⁰ Untested and unproven, it will do little to bolster United States efforts to combat the growing submarine threat.

Next, the United States must acknowledge that certain submarine developments in China will lead to Chinese local area sea control. While Taiwan is certainly an important issue for the United States, it should not be the focus. The United States must state that

²²⁶ “China And Northeast Asia: Defense Production and R & D,” *Jane's Sentinel Security Assessment* April 2007, www.janes.com (accessed 12 September 2008), 10.

²²⁷ Ibid.

²²⁸ Ibid.

²²⁹ Representative John L. Mica, “Earmark Declaration: Extensions of Remarks,” May 2008, <http://thomas.loc.gov/cgi-bin/query/D?r110:1:/temp/~r110d8k71C::> (accessed 25 December 2008).

²³⁰ Richard R. Burgess, “It’s Disposable: The Coyote Unmanned Aerial Vehicle Would Be Launched From a Patrol Plane’s Sonobuoy Chutes,” Navy League of the United States, March 2006, http://www.navyleague.org/sea_power/mar06-24.php (accessed 26 December 2008).

any encroachment on Japanese waters is an effort by China to establish local area sea control, not an effort to defeat Taiwan. If China believes that the United States thinks, “China continues to modernize and develop military capabilities primarily focused on a Taiwan Strait conflict” China will continue non-transparent submarine development.²³¹ If the United States identifies Chinese submarine development as China’s path toward regional dominance, the United States Navy will refocus their efforts to meet this threat. If the United States works with Japan to counter China’s submarine modernization the overall cost for both nations will be reduced while simultaneously increasing the likelihood of overall program success and long-term interoperability.

To successfully meet this threat to American regional dominance, changes in security policy must be made. According to Thomas Donnelly, “we’ve reached the limit of our ability to think our way out of our military dilemma. It’s time to stop thinking and start spending. Only a larger and more capable force – a more expensive force – can give us the strategic options we so desperately need.”²³² How will post Cold War defense size policy, established by President George H.W. Bush, change with the incoming administration? More specifically, how will the new administration deal with encroachment on Japanese waters by an ever-expanding Chinese submarine force? Regardless of the answer, The National Security Policy Process: The National Security Council and the Inter-agency System describes a prerequisite. “The President needs a defined and smoothly functioning policy development and decision-making process.”²³³ Only with a competent, well-informed group of policy writers - focused on Asian security through joint American-Japan regional dominance – can this challenge be met.

²³¹ 2008 *National Defense Strategy*, 10.

²³² Thomas Donnelly, “Kill the QDR,” *Armed Forces Journal*, February 2006, http://www.aei.org/publications/filter_.pubID.23805/pub_detail.asp (accessed 26 December 2008).

²³³ Alan G. Whittaker, Frederick C. Smith, and Elizabeth McKune, “The National Security Policy Process: The National Security Council and Interagency System,” Industrial College of the Armed Forces, National Defense University, U.S. Department of Defense, November 2008, <http://www.ndu.edu/icafe/publication/nsc/docs/icafe-nsc-policy-process-report-11-2008.pdf> (accessed 26 December 2008).

D. SUMMARY

This thesis revealed the challenges to not only China, but also the region when the Type 094 ballistic missile submarine is placed on deterrent patrol. Without question, this submarine will greatly enhance the survivability of China's nuclear deterrent force. The Type 094 will be a capable, modernly quiet submarine, and given the current state of western ASW, may be able to patrol undetected. What does this mean for the future of China's no-first-use policy? When the Type 094 is put into service, China will possess nuclear capabilities far in excess of the requirement for limited nuclear retaliation. Options, such as the ability to utilize nuclear coercion or go "blow to blow" in a nuclear war, will be available—but it is not known whether Beijing will capitalize on these new opportunities.

The leadership in China will face a number of challenges when it deploys the Type 094. Most notably, the Type 094 will cause the government in Beijing to lose a portion of control over their nuclear weapons. This loss of control is due to the nature of submarine communications, which makes constant, uninterrupted communication difficult if not impossible. Currently communications may prove to be a PLAN weakness, but this will likely change in the near future.²³⁴ Soon the PRC will surpass the Russia's ballistic missile submarine arsenal, due to a dedicated effort to develop an addition to Beijing's nuclear land force. How will the United States face this challenge?

The United States must be ready to accept a degree of vulnerability from Chinese nuclear forces. This may not be acceptable to many in Washington, but there is simply no other course of action. Without a focused effort to insure ASW shortcomings are addressed, this vulnerability will continue for the foreseeable future. By switching strategy to indicate China's regional expansion, vice only focusing on Taiwan, Washington planners can adjust future weapons acquisitions to match. The Type 094 is an unsettling advanced nuclear platform, with destructive capability unwarranted in current nuclear drawdown talks.

²³⁴ Addressed in Chapter IV.

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LIST OF REFERENCES

- 1K1QFK. Renato Romero. "Exploring ULF-ELF and VLF Radio Band: Reception of Submarine Communications System." <http://www.vlf.it/submarine/sbmarine.html> (accessed 30 April 2009).
- Associated Press*. "U.S. Announces P-3 Orion Replacement: Boeing MMA." 15 June 2004. <http://www.defencetalk.com/forums/archive/index.php/t-1726.html> (accessed 31 March 2009).
- Baev, Pavel. "The Russian Navy after Kursk: Still Proud but with Poor Navigation." PONARS Policy Conference: Washington DC, January 2005. http://www.csis.org/media/isis/pubs/pm_0215.pdf (accessed 2 May 2009), 3.
- BBC Monitoring Asia Pacific*. "Chinese Navy Completes Construction of "094" Nuclear Submarine." Translation of *Ming Pao Online*, 26 July 2007.
- BBC News: Asia-Pacific*. "China sub deaths 'must rouse Navy.'" 4 May 2003. <http://news.bbc.co.uk/2/hi/asia-pacific/2999533.stm> (accessed 3 May 2009).
- Bolt, P.J. and A.S. Willner. *China's Nuclear Future*. Boulder: Lynne Rienner Publishers, 2005.
- Bracken, Paul J. *Fire in the East: The Rise of Asian Military Power and the Second Nuclear Age*. New York: Harper Collins Publishers, 1999.
- Burgess, Richard R. "It's Disposable: The Coyote Unmanned Aerial Vehicle Would Be Launched From a Patrol Plane's Sonobuoy Chutes." Navy League of the United States, March 2006. http://www.navyleague.org/sea_power/mar06-24.php (accessed 26 December 2008).
- Burr, William. "Missile Defense Thirty Years Ago: Déjà vu All Over Again?" The National Security Archive Online, 18 December 2000. <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB36/> (accessed 7 May 2009).
- Burrows, William. *Deep Black: Space Espionage and National Security*. New York: Berkeley Books, 1988.
- Bussert, James C. "Chinese Submarines Pose a Double-Edged Challenge." *SIGNAL Magazine*, December 2003. <http://www.afcea.org/signal/articles/anmviewer.asp?a=93&print=yes> (accessed 3 March 2008).

- Chang, Gordon H. "To the Nuclear Brink: Eisenhower, Dulles, and the Quemoy-Matsu Crisis," *International Security*, vol. 12, no. 4 (Spring 1988): 96-123.
- Defense Daily International*. "Rising China Threat Unmet If U.S. Navy Doesn't Seek Funds To Counter It, Analysts Say." Editorial, 18 January 2008.
<http://www.defensedaily.com/VIP/common/pub/ddi/ddi01180801.html> (accessed 9 February 2008).
- Dickie, Mure and Demetri Sevastopulo. "US Concerns as China Builds Nuclear Subs." *Financial Times*. 25 May 2007.
- Donnelly, Thomas. "Kill the QDR." *Armed Forces Journal*, February 2006.
http://www.aei.org/publications/filter.,pubID.23805/pub_detail.asp (accessed 26 December 2008).
- Drew, Christopher. "Contractors Reach Deal on Destroyer." *The New York Times*, 8 April 2009.
http://www.nytimes.com/2009/04/09/business/09defense.html?_r=1&demc=eta1 (accessed 8 April 2009).
- Ellis, Jason D. and Todd M. Koca, "China Rising: New Challenges to the U.S. Security Posture," *Strategic Forum*, no. 175, October 2000.
<http://www.ciaonet.org/wps/elj01/elj01.pdf> (accessed 21 May 2009).
- Erickson, Andrew S. and Lyle J. Goldstein. "China's Future Nuclear Submarine Force: Insights from Chinese Writings." *Naval War College Review* 60, no. 1 (Winter 2007): 54-79.
- Erickson, Andrew S., Lyle J. Goldstein, William S. Murray, and Andrew R. Wilson. *China's Future Nuclear Submarine Force*. Annapolis: Naval Institute Press, 2007.
- Fanjoy, Richard O. "U.S. Forward Maritime Strategy and Soviet SSBNs: Optimum Targeting or Escalatory Dilemma." *National War College*, 9 April 1990.
<http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA437400&Location=U2&doc=GetTRDoc.pdf> (accessed 10 June 2009).
- Federation of American Scientists. "Yulin (Sanya) Naval Base: Hainan Island, China." DigitalGlobe ©2008; JPG.
<http://www.fas.org/programs/ssp/nukes/images/Hainan-full.jpg> (accessed 1 April 2009).
- Foreman, William. "Chinese Submarine Accident Kills 70." *Naval Sea Systems Command*, 2 May 2003.
<http://www.dcfp.navy.mil/mc/articles/other/MingSub.htm> (accessed 3 May 2009).

- Gertz, Bill. "China Sub Secretly Stalked U.S. Fleet; Surfaced Within Torpedo Range of Aircraft Carrier Battle Group." *The Washington Times*, 13 November 2006. <http://www.washingtontimes.com/national/20061113-121539-3317r.htm> (accessed 9 February 2008).
- Gertz, Bill. "China Tests Ballistic Missile Submarine." *The Washington Times*, 3 December 2004. <http://www.washingtontimes.com/national/20041202-115302-2338r.htm> (accessed 16 April 2009).
- Ghoshal, Baladas. "India and China: Emerging Strategic Partnership in the Twenty-first Century?" *The China-India Project, Occasional Paper Series*, no. 2, 2005. http://www.hku.hk/cas/pub/Occasional2_bghoshal.pdf (accessed 30 March 2009).
- GlobalSecurity. "Military: Submarine Communications." © 5 September 2008; JPG. <http://www.globalsecurity.org/military/systems/ship/sub-comm.htm> (accessed 30 April 2009).
- Goodyear Aerospace Corporation. "Study of Submarine Casualty Training." March 1986. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=AD486430&Location=U2&doc=GetTRDoc.pdf> (accessed 2 May 2009).
- Gordon, Michael R. "Bush Is Due to Meet Chinese on Issues Crucial for Ties." *The New York Times*, 19 March 2001. <http://www.udel.edu/communication/COMM418/begleite/globalagenda/readings/NYTchina2.htm> (accessed 21 May 2009).
- Howarth, Peter. *China's Rising Sea Power: The PLA Navy's Submarine Challenge*. Oxon: Routledge, 2006.
- India News Online. "Another Indian Air Field Reopens on China Border," 10 November 2008. <http://news.indiamart.com/news-analysis/another-indian-air-f-20297.html> (accessed 21 May 2009).
- Isby, David C. "China's SSBN is based with 1st Submarine Flotilla near Qingdao, claim reports." *Jane's Missiles and Rockets Information Group*, 1 Nov 2006. www.janes.com (accessed 14 April 2009).
- James Martin Center for Nonproliferation Studies. Monterey Institute of International Studies. "Statement of the Government of the People's Republic of China." 16 October 1964. <http://www.nti.org/db/china/engdocs/nucsta64.htm> (accessed 20 April 2009).
- . "Chiao Kuan-hua's Speech at the UN General Assemble," 24 November 1971. <http://www.nti.org/db/china/engdocs/ch1171.htm> (accessed 20 April 2009).
- Jane's Sentinel Security Assessment*. "China And Northeast Asia: Defense Production and R & D." April 2007. www.janes.com (accessed 12 September 2008).

- . “China and Northeast Asia: Navy, China.” 3 February 2009. www.janes.com (accessed 10 April 2009).
- Jane's Naval Forces News*. “China's New Sub Base to Make Waves.” Editorial, 2006. www.janes.com (accessed 3 March 2008).
- Jane's Strategic Weapons Systems*. “Jane's Underwater Warfare Systems: Delta III class.” 15 January 2009. www.janes.com (accessed 10 June 2009).
- . “Jane's Underwater Warfare Systems: Delta IV class.” 15 January 2009. www.janes.com (accessed 10 June 2009).
- . “JL-2 (CSS-NX-5).” 3 June 2003. www.janes.com (accessed 10 June 2009).
- Jiadong, Qian. “Eliminating Nuclear Weapons: China's Policy.” Letter, James Martin Center for Nonproliferation Studies. Monterey Institute of International Studies, 7 November 1998. <http://www.nti.org/db/china/engdocs/qjd1198.htm> (accessed 20 April 2009).
- Johnston, Alastair Iain. “China's New ‘Old Thinking:’ The Concept of Limited Deterrence.” *International Security*, vol. 20, no. 3 (Winter 1995/96): 5-42.
- Joubert, P.N. “Aspects of Submarine Design.” Australian Government. Department of Defense. Defence Science and Technology Organisation. <http://dSPACE.dsto.defence.gov.au/dSPACE/bitstream/1947/3919/1/DSTO-TR-1622%20PR.pdf> (accessed 1 April 2009).
- Kamphausen, Roy and Andrew Scobell. “Right Sizing the People's Liberation Army: Exploring the Contours of China's Military.” Strategic Studies Institute. U.S. Army War College, September 2007. <http://www.strategicstudiesinstitute.army.mil/pdf/PUB784.pdf> (accessed 22 February 2009).
- Kaplan, Robert D. “Center Stage for the Twenty-first Century: Power Plays in the Indian Ocean.” *Foreign Affairs*, vol. 88, no. 2 (March/April 2009): 16-32.
- Kapila, Subhash. “Global Power Balance 2020: Perspectives.” South Asia Analysis Group, no. 2914, 4 November 2008. <http://www.southasiaanalysis.org/%5Cpapers30%5Cpaper2914.html> (accessed 4 May 2009).

- Kissinger, Henry. "Letter to Richard Nixon: Issues Concerning ABM Deployment." National Archives. Nixon Presidential Materials Project. National Security Council Files. box 843. ABM Memoranda, 5 March 1969. <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB36/18-01.htm> (accessed 7 May 2009).
- Kristensen, Hans M. "Russian Submarine Patrols 1981-2006." Federation of American Scientists, © April 2007; PDF. <http://www.nukestrat.com/russia/patrol.pdf> (accessed 7 May 2009).
- . "Type 094 (Jin-class) SSBN." Federation of American Scientist, The Nuclear Information Project, 24 April 2008. http://www.fas.org/nuke/guide/china/slbn/type_94.htm (accessed 7 June 2009).
- Kristensen, Hans M., Robert S. Norris, and Matthew G. Mcinzie. Federation of American Scientists and The Natural Resources Defense Council. *Chinese Nuclear Forces and U.S. Nuclear War Planning*. 2006.
- Lewis, John Wilson and Xue Litai. *China's Strategic Seapower: The Politics of Force Modernization in the Nuclear Age*. Stanford, Ca: Stanford University Press, 1994.
- Manning, Robert A., Ronald Montaperto, and Brad Roberts, "China, Nuclear Weapons, and Arms Control." *PacNet Number 20*, Pacific Forum CSIS, 19 May 2000. <http://www.csis.org/media/csis/pubs/pac0020.pdf> (accessed 4 May 2009).
- May, Greg. "China's Opposition to TMD is More About Politics Than Missiles." *Foresight* (Tokyo), February 2000. http://www.nixoncenter.org/publications/articles/2_00ChinaTMD.htm (Accessed 9 March 2009).
- McGruther, Kenneth R. *The Evolving Soviet Navy*. Newport: Naval War College Press, 1978.
- McVadon, Eric A. "China's Maturing Navy." *Naval War College Review*, vol. 59, no. 2 (Spring 2006): 90-107.
- Medeiros, Evan S. "Ballistic Missile Defense and Northeast Asian Security: Views from Washington, Beijing, and Tokyo." The Stanley Foundation and Center for Nonproliferation Studies, Monterey Institute of International Studies, April 2001. 9.
- Miasnikov, E.V. "The Future of Russia's Strategic Nuclear Forces: Discussions and Arguments." Moscow. Institute of Physics and Technology. Center For Arms Control, Energy, and Environmental Studies at Dolgoprudny. 1995. <http://www.fas.org/spp/eprint/snf03221.htm> (accessed 1 April 2009).

- Mica, John L. "Earmark Declaration: Extensions of Remarks." May 2008.
<http://thomas.loc.gov/cgi-bin/query/D?r110:1:./temp/~r110d8k71C::> (accessed 25 December 2008).
- Military-Today*. "Jin Class: Ballistic Missile Submarine." http://www.military-today.com/navy/jin_class.htm (accessed 10 June 2009).
- Mizin, Victor and Michael Jasinski. "The Future of the Russian Sea-Based Deterrent." *The Journal of Slavic Military Studies*, vol. 16, no. 1 (July/September 2003): 69-83.
- Mr. T in DC (Alias). "Old U.S. Radio Towers." flickr © 3 September 2007; JPG.
http://images.google.com/imgres?imgurl=http://farm2.static.flickr.com/1185/1317352346_f642bc67.jpg%3Fv%3D0&imgrefurl=http://www.flickr.com/photos/mr_t_in_dc/1317352346/in/set-72157600273766479/&usg=__mTVDNa_Cinego30WQDyWfcR7P0w=&h=334&w=500&sz=90&hl=en&start=16&um=1&tbnid=iaPzSmmWSfFbnM:&tbnh=87&tbnw=130&prev=/images%3Fq%3Dgreenbury%2Btowers%26hl%3Den%26safe%3Doff%26client%3Dsafari%26rls%3Den-us%26sa%3DN%26um%3D1
 (accessed 30 April 2009).
- Mulvenon, James C. and Andrew N.D. Yang. "The People's Liberation Army as an Organization: Reference Volume v1.0." Rand: National Security Research Division, 2002.
http://www.rand.org/pubs/conf_proceedings/2008/CF182part1.pdf (accessed 10 June 2009).
- Mulvenon, James and David Finkelstein. "China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army." The CNA Corporation, December 2005.
<http://www.cna.org/documents/doctrinebook.pdf> (accessed 23 February 2009).
- National Geographic Online*. "Evolution of Subs: U.S. and Soviet Submarine Milestones of the Cold War." http://www.nationalgeographic.co.uk/k19/sub_detail_sov4.html (accessed 7 May 2009).
- Nixon, Richard. "Handwritten Response to Henry Kissinger's Letter: Issues Concerning ABM Deployment." National Archives. Nixon Presidential Materials Project. National Security Council Files. box 843. ABM Memoranda, 5 March 1969.
<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB36/18-01.htm> (accessed 7 May 2009).

- Norling, Nicklas. "China and Russia: Partners with Tensions." *Policy Perspectives*, vol. 4, no. 1, 2007.
http://www.silkroadstudies.org/new/docs/publications/2007/Norling_China_and_Russia.pdf (accessed March 30, 2009).
- O'Rourke, Ronald. "CRS Report for Congress: China Naval Modernization: Implications for U.S. Navy Capabilities – Background and Issues for Congress." Congressional Research Service. 8 Oct 2008.
<http://fpc.state.gov/documents/organization/112036.pdf> (accessed 22 February 2009).
- Pan, Zhenqiang. "On China's No First Use of Nuclear Weapons." Pugwash Meeting: London, United Kingdom, no. 279, 15-17 November 2002.
<http://www.pugwash.org/reports/nw/zhenqiang.htm> (accessed 20 April 2009).
- People's Daily*. "China-Russian Relations Remain Better Than Russian-U.S. Ties," 28 November 2002.
http://english.peopledaily.com.cn/200211/28/eng20021128_107614.shtml (accessed 30 March 2009).
- People's Republic of China. Information Office of the State Council. *White Paper: China's Endeavors for Arms Control, Disarmament and Non-Proliferation*. 2006.
- . *White Paper: China's National Defense in 2000*. October 2000.
- . *White Paper: China's National Defense in 2002*. December 2002.
- Perry, William J., Brent Scowcroft, and Charles D. Ferguson. "U.S. Nuclear Weapons Policy (Uncorrected Proofs)." Council on Foreign Relations, April 2009.
http://www.cfr.org/content/publications/attachments/Nuclear_Weapons_TFR62.pdf (accessed 7 May 2009).
- Polk, Stephen. "China's Nuclear Command and Control." *Air Power*, vol. 2, no. 4, Winter 2005.
<http://www.aerospaceindia.org/Journals/Winter%202005/China's%20Nuclear%20Command%20and%20Control.pdf> (accessed 10 June 2009).
- Quinlan, Michael. "The Future of United Kingdom Nuclear Weapons: Shaping the Debate." *International Affairs*, vol. 82, no. 4 (July 2006): 627-638.

- Rice, Condoleezza. "Campaign 2000: Promoting the National Interest." *Foreign Affairs*, vol. 79, no. 1, January/February 2000.
<http://www.foreignaffairs.com/articles/55630/condoleezza-rice/campaign-2000-promoting-the-national-interest> (accessed 10 June 2009).
- Reuters. "China's Hu Says PLA Should Learn from Sub Disaster." 4 May 2005.
<http://www.dcfp.navy.mil/mc/articles/other/MingSub.htm> (accessed 10 April 2009).
- Scobell, Andrew and Larry M. Wortzel. "China's Growing Military Power: Perspectives On Security, Ballistic Missiles, and Conventional Capabilities." Strategic Studies Institute. U.S. Army War College, September 2002.
<http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB59.pdf> (accessed 22 February 2009).
- Sha, Zukang. "U.S. Missile Defence Plans: China's View," *Disarmament Diplomacy*, no. 43, January/February 2000. <http://www.acronym.org.uk/dd/dd43/43usnmd.htm> (accessed 7 March 2009).
- Shambaugh, David. *Modernizing China's Military: Progress, Problems, and Prospects*. Berkley: University of California Press, 2004.
- Shirk, Susan L. (Interview by Joanne J. Myers). "China: Fragile Superpower: How China's Internal Politics Could Derail its Peaceful Rise." Carnegie Council: The Voice for Ethics in International Policy (transcript), April 5, 2007.
<http://www.cceia.org/resources/transcripts/5425.html> (accessed 3 May 2009).
- SinoDefense Online, "Type 094 (Jin-class) Nuclear-Powered Missile Submarine."
www.sinodefence.com, JPG.
<http://www.sinodefence.com/navy/sub/type094jin.asp> (accessed 10 June 2009).
- Stocker, Jeremy. "The United Kingdom and Nuclear Deterrence." *Adelphi Papers*, no. 46(386). <http://www.informaworld.com/10.1080/05679320701266349> > (accessed 2 March 2009).
- Twomey, Christopher and Sarah Watson, "U.S.-China Strategic Dialogue, session IV." Report forthcoming, to be available at ccc.nps.navy.mil under Conference Reports tab.
- United Kingdom. Royal Navy Website. "Ballistic Submarines (SSBN)."
<http://www.royalnavy.mod.uk/server/show/nav.2420> (accessed 31 January 2009).
- United Kingdom. The Defence Council. Ministry of Defence. *The Future United Kingdom Strategic Nuclear Deterrent Force*. Defence Open Government Document 80/23. July 1980.

- United Kingdom. House of Commons. Parliament. *The Future of the UK's Strategic Nuclear Deterrent: the White Paper, Ninth Report of Session 2006-07*. 2007.
- United States of America. Department of Defense. *Annual Report to Congress: Military Power of the People's Republic of China 2007*. 2007,
<http://www.defenselink.mil/pubs/pdfs/070523-China-Military-Power-final.pdf>.
 (accessed 14 April 2009).
- United States of America. Department of Defense. Missile Defense Agency. "Frequently Asked Question (FAQ): Sea-Based Midcourse - Aegis Ballistic Missile Defense (Aegis BMD)." <http://www.mda.mil/mdalink/html/faq.html> (accessed 7 March 2009).
- United States of America. Department of State. International Security Advisory Board (ISAB) Task Force. *China's Strategic Modernization*. September 2008.
<http://www.fas.org/nuke/guide/china/ISAB2008.pdf> (accessed 10 June 2009).
- United States of America. The Chairman of the Joint Chiefs of Staff. *The National Military Strategy of the United States of America: A Strategy for Today; A Vision for Tomorrow 2004*. 2004.
http://209.85.173.104/search?q=cache:3Jcb_kpsT3kJ:www.defenselink.mil/news/Mar2005/d20050318nms.pdf+national+defense+strategy+secretary+of+defense&hl=en&ct=clnk&cd=1&gl=us&client=safari (accessed 12 September 2008).
- United States of America. The Chief of Naval Operations. *The Cooperative Strategy for 21st Century Seapower*. October 2007.
http://209.85.173.104/search?q=cache:9AK09_dTwHkJ:www.navy.mil/maritime/MaritimeStrategy.pdf+Maritime+strategy&hl=en&ct=clnk&cd=1&gl=us&client=safari (accessed 12 September 2008).
- United States of America. The Secretary of Defense. *2008 National Defense Strategy*. June 2008.
<http://www.defenselink.mil/news/2008%20National%20Defense%20Strategy.pdf>
 (accessed 12 September 2008).
- United States of America. The White House. *The National Security Strategy of the United States of America*. March 2006.
<http://www.whitehouse.gov/nsc/nss/2006/nss2006.pdf> (accessed 12 September 2008).
- United States Navy. Commander: Submarine Force. "Atlantic Submarine Force Organization." <http://www.sublant.navy.mil/SubsSquadrons.htm> (accessed 8 June 2009).

- United States Navy. Commander: Submarine Force U.S. Pacific Fleet. "COMSUBPAC Submarines." http://www.csp.navy.mil/content/comsubpac_subsquadrons.shtml (accessed 8 June 2009).
- Vick, Charles P. "TYPE-094." www.globalsecurity.org ©2008; JPG. <http://www.globalsecurity.org/wmd/world/china/images/type094-line.jpg> (accessed 1 April 2009).
- Whittaker, Alan G., Frederick C. Smith, and Elizabeth McKune, "The National Security Policy Process: The National Security Council and Interagency System." Industrial College of the Armed Forces. National Defense University. U.S. Department of Defense, November 2008. <http://www.ndu.edu/ica/publication/nsc/docs/ica-nsc-policy-process-report-11-2008.pdf> (accessed 26 December 2008).
- Xinhua News Agency* (English). "Liberation Army Daily Criticizes U.S. Missile Defense Plan." 25 January 1999.
- Yoshihara, Toshi and James R. Holmes. "China's New Undersea Nuclear Deterrent: Strategy, Doctrine, and Capabilities." *Joint Forces Quarterly* (JFQ), Issue 50, 3rd Quarter 2008. http://www.ndu.edu/inss/Press/jfq_pages/editions/i50/11.pdf (accessed 22 February 2009).
- Yuan, Jing-dong. "Do China's New Submarines Signal a New Strategy?" *WMD Insights*, July/August 2007. http://www.wmdinsights.com/I17/I17_EA1_ChinasNewSubmarines.htm (accessed 26 February 2008).

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